

SCOTLAND'S STORY

2

**Defying the
might of the
Roman Empire**

**Priceless relic
from the depths
of the Minch**

**Home to an
island haven**

**The bridges of
William Arrol**

**First Scotland
England match**

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ATLANTIC
OCEAN

2,500BC

Society undergoes a dramatic change as metal brings wealth, status and power.



1,200BC

Gold torc lost in the Minch, to be discovered by two fishermen 3,200 years later



1,000BC

Our early ancestors find it safer to build enclosed settlements, such as the man-made islands called crannogs.



700BC

Start of the Iron Age. Many bronze objects are offered to gods and goddesses, such as the wooden figurine found at Ballachulish.



325BC

First written record of Celtic tribes living in Scotland. But their culture was well developed by this time.



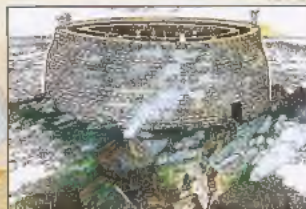
79AD

Julius Agricola marches his Roman legions into Scotland.



200BC

First drystone broch towers appear, built on a double-wall principle.



84

The Romans strike north and meet the Caledonian army under its general, Calgacus, in the Battle of Mons Graupius.



215

Romans abandon their northern outposts, harried by the Picts and their war trumpets.



**In Part 3:
New light on
the dark ages**

PART OF
IRELAND

North
Channel

PART OF
ENGLAND



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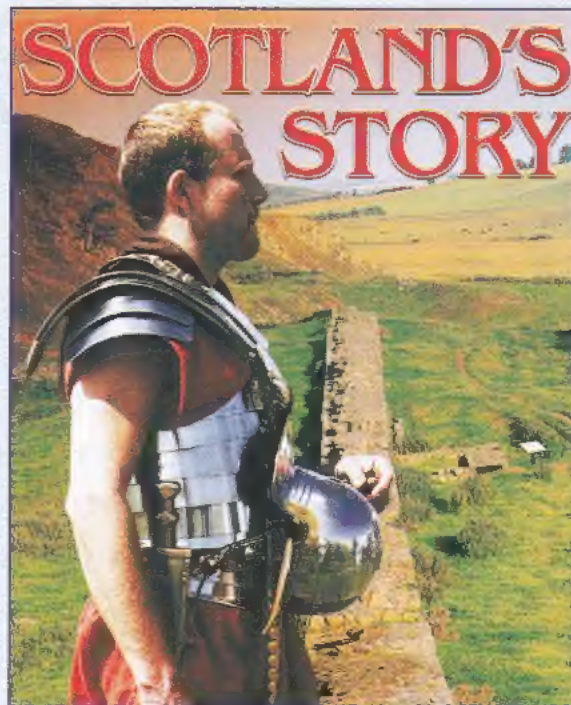
We relied on Roman and Greek writers for much of our beliefs about early Celtic tribes in Scotland. But these were the writings of enemies.

Contributors

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COVER: A member of the Ermine Street Guard, which re-enacts Roman battles, set against the remains of Hadrian's Wall.

The first war of independence

Popular mythology would have us believe the Romans entered a dark, tree-covered land peopled by painted barbarians called the Picti. But that is just the Roman view of a nation they tried to subjugate -- and failed.

In fact, the legions invaded a sophisticated Celtic culture that was well aware of their reputation. Two advanced civilisations became entangled in a deadly struggle.

The Caledonians chose not to be part of the Roman Empire, and many must have paid the price with their lives.

The Romans came, they saw... but even after 300 years they still had not conquered.

Caledonians, Picts, Gaels, Britons -- all of these Iron Age people have been confusingly labelled as Celtic. But what does that word mean?

Until the Second World War, scholars searched for the origin of a Celtic race across Europe, but today the Celtic race seems more a dangerous academic fantasy than a useful concept.

The Celts were never a single people, but rather diverse peoples with related cultures and languages

which influence Scotland's identity to this day.

Just how sophisticated people were in this country even 3,000 years ago came to light when two fishermen dredged up an exquisite 24-carat gold torc in the Minch. The amazing story, never before told, is a reminder that history is to be found here, there and anywhere.

The happenstance nature of the seabed find by Donald MacSween and Kenny Cunningham is in contrast to the systematic work of the underwater archaeologists.

We have them to thank for our detailed knowledge of life in crannogs, these intriguing lake dwellings which were a feature of many areas of Scotland.

Archaeologists have had less success in uncovering the secrets of the brochs, but the skill of the builders who created these towers is there for all to see.

Their hollow-wall technique shows a mastery of drystone building, as does their survival after 3,000 years of battering by storms, and the ravages of vandals.

It is tempting to wonder how many of today's tower blocks will be standing 3,000 years from now.

Life was safer on the water

Homes built on man-made islands were easy to defend against attacks. These crannogs, many now submerged, have proved to be treasure troves of information about our ancestors

■ You can experience what life was like 2,500 years ago at this crannog at Kenmore in Perthshire.



The ancient lake-dwellings called crannogs are artificial islands, often comprising a timber platform on which stood a massive wooden roundhouse. They were usually linked to the shore by timber gangways or stone causeways.

Quite why the builders chose to live on the water is far from clear, but life would certainly have been safer. Crannogs would have been easily defended against small-scale raiding parties.

The remains of these dwellings are common in many areas of Scotland – particularly the south-west and central Highlands, and the Western Isles. And because they have been submerged, crannogs are archaeological treasure-houses.

In normal dry-land conditions, organic material like wood, leather, seeds, nuts and straw decay and vanish.

In waterlogged conditions, however, these perishable materials can survive in pristine condition and shed a new light on the prehistoric past. Excavations on crannogs have produced such items as wooden bowls and cups, which fill gaps in the normal archaeological record and show the skill of early woodworkers.

Numerous crannogs lie submerged, close to the shore, along both sides of Loch Tay. Because of their numbers and the intervals between them it is reasonable to think that each formed the centre of an

Iron Age farm. The inhabitants

would have grown a variety of crops along the shore, and reared cattle and sheep on the steep slopes above the loch. Like their modern descendants, they probably took their stock up to the higher shieling grounds during the summer and wintered them in the shelter of the farm.

To ensure a steady supply of timber to build and maintain their homes, they carefully managed the few pockets of woodland in the valley – planting and coppicing. Beyond the loch-side fields, they gathered wild foods and medicines, and traded with communities within and beyond their tribal group.

There were a number of these man-made islands on Loch Tay at the point where the River Tay leaves the loch. You can now see a crannog and find out what life was like on the loch 2,500 years ago by visiting a reconstruction at Kenmore based on studies of the 2,500-year-old Oakbank Crannog off Fearnan village, and built using local materials and methods of those ancient times.

The evidence gleaned by underwater archaeology detectives, who have been investigating Loch Tay since 1980, has helped to create a dwelling to house an extended family of 15-20 people.

It is a circular construction on stilts, the piles driven deep into the loch bed. The thatch roof is of Tay reeds pitched at 50 degrees to drain rain or snow, and remains impenetrable for years. The floor is made of slim logs covered with bracken or ferns.

Oak and alder woods were used in the construction, and a wattle wall of hazel rods lets light in but keeps the

worst of the weather out. A flat-stone fireplace for cooking and heating is in the centre of the crannog, but the high ceiling would have prevented smoke becoming too much of a problem.

In ancient times it was important to ensure the fire never went out, and the crannog people would have enjoyed swapping stories and probably music at the fireside. The walls have storage space for provisions to see them through the winter.

A picture emerges of the people who lived in the crannogs. They were not the savages so often depicted, but intelligent folk who kept cattle, sheep and goats and sensibly protected themselves in their loch homes from robbers who might be after a cow or a wife.

Underwater discoveries of a wooden plough, barley and two kinds of wheat demonstrate that these Loch Tay crannog-dwellers were also successful farmers. They would have enjoyed meals of lamb, beef and boar, supplemented by fish, cheese, hazelnuts, greens such as nettles, sorrel, and wild cabbages, and a range of wild fruits.

Mainly wooden bowls and plates were used, as there was no good source of clay locally for pots. They could weave fine woollens and make leather items such as shoes or bags.

They wore jewellery and polished stone beads. Transport in the main was by water, because there were no roads. A 30ft wooden boat discovered here could well have been an early Loch Tay ferry.

Visitors to the Scottish Crannog Centre can try out the ancient art of making fire without matches, drilling holes through stones, spinning wool into thread or fashioning utensils by an early lathe method.

The centre at Kenmore, Perthshire, was created by the Scottish Trust for Underwater Archaeology (STUA), and is open daily from April 1 to October 31. ●

TIMELINE

1,500-600 BC

Bronze swords, spears axes and shields are made and used.

1,000 BC

Settlements and hill forts enclosed in ramparts, palisades, banks and ditches appear.

700 BC

Iron working starts in Scotland.

500 BC

The Oakbank Crannog is constructed. Crannogs are in use throughout this time.

425 BC

The Greek philosopher Democritus theorises that all matter is made of very small atoms.

399 BC

The death of Socrates.

200 BC

Building of drystone broch towers begins.

100 AD

Brochs cease to be built, but are still in use.



■ Inside the crannog reconstruction at Kenmore.



Towering enigmas by master builders

The brooding broch towers which once dotted our ancient landscape retain much of their mystery. But the many surviving examples give us an insight into Iron Age engineering

For most of us, our home is part refuge, part status symbol. That was just as true during the later Bronze and Iron Age, between 1,000 BC and 100 AD, when Scotland was covered with the farms of settled and prosperous tribes.

The centrepiece of these farms was a large roundhouse. In the south and east of the country, where timber was plentiful, these were usually massive wooden buildings with conical roofs rising up to 40ft above the ground.

Unfortunately, centuries of intensive farming have wiped out all traces of them from the Lowlands.

Further north, wood was less easily available, and so prehistoric farmers built their roundhouses from stone. These Atlantic roundhouses, so-called because they are most common around Scotland's Atlantic coasts, include the most imposing of all Iron Age buildings – the broch towers.

Among the finest architectural achievements of prehistoric Europe, they are found only in Scotland. Some of the best examples are located in Orkney, Shetland and the Western Isles. Some are well-preserved, like Mousa in Shetland and Dun Carloway in Lewis – both in the care of Historic Scotland – and they give a rare glimpse into Iron Age life.

Broch towers were formed by building two concentric drystone walls which were bonded together at intervals by rows of flat slabs. This created a huge hollow-walled tower, with the space between the walls forming galleries and staircases that gave access to upper floors.

This technique showed a mastery of drystone building. The hollow wall construction saved on stone, and the intricate bonding of the stones channelled all of the weight stresses effectively to avoid collapse. It is a

testimony to the skill of the builders that so many survive today.

Although they appear today as rather grim and featureless stone shells, broch towers would originally have had a different appearance.

Inside they would have had several floors, each formed of timber and divided into rooms. These floors rested on ledges known as scarcements which can still be seen on many brochs. Cattle and sheep may have been housed on the ground floor, with the main living area at first-floor level.

All of them may have been capped by a conical thatched roof.

The fully-developed broch towers were the culmination of a long period of experimentation. The earliest Atlantic roundhouses date to around 600 BC. However, it was not

Rousay, where small enclosed villages grew up around the central tower. The best example can still be seen at Gurness.

These were the seats of tribal chiefs whose power may well have extended over quite large areas.

Fragments of containers found locally show that the families who lived there enjoyed wine and olives from the Mediterranean in a period when the Roman army had not reached beyond the south of England.

The clustered villages around Gurness and Midhowe may have developed quite late as certain broch-dwelling families came to the fore. On Hebridean islands like Barra and North Uist, there are so many of these Atlantic roundhouses that they cannot possibly all have belonged to powerful chiefs. In fact, their numbers are similar to the amount of tenant farmers who held land on the same islands 200 years ago.

Indeed, it seems that these roundhouses were built and occupied by a range of families, from tribal chiefs to moderately prosperous farmers.

The buildings were monumental farmhouses, built to leave the onlooker in no doubt as to whose land they were on. Their

occupants would have grown barley and raised cattle, sheep and pigs.

By around 100 AD, the fashion for broch-building seems to have ended across the North and West, but that did not mean that the dynasties had been usurped.

Far from it. The settlements that had grown up around the Orkney brochs continued to thrive and prosper for many hundreds of years.

Neither had the broch-dwellers of Barra and North Uist disappeared. These sites carried on as rather less elaborate settlements... but no less prosperous for that. ●



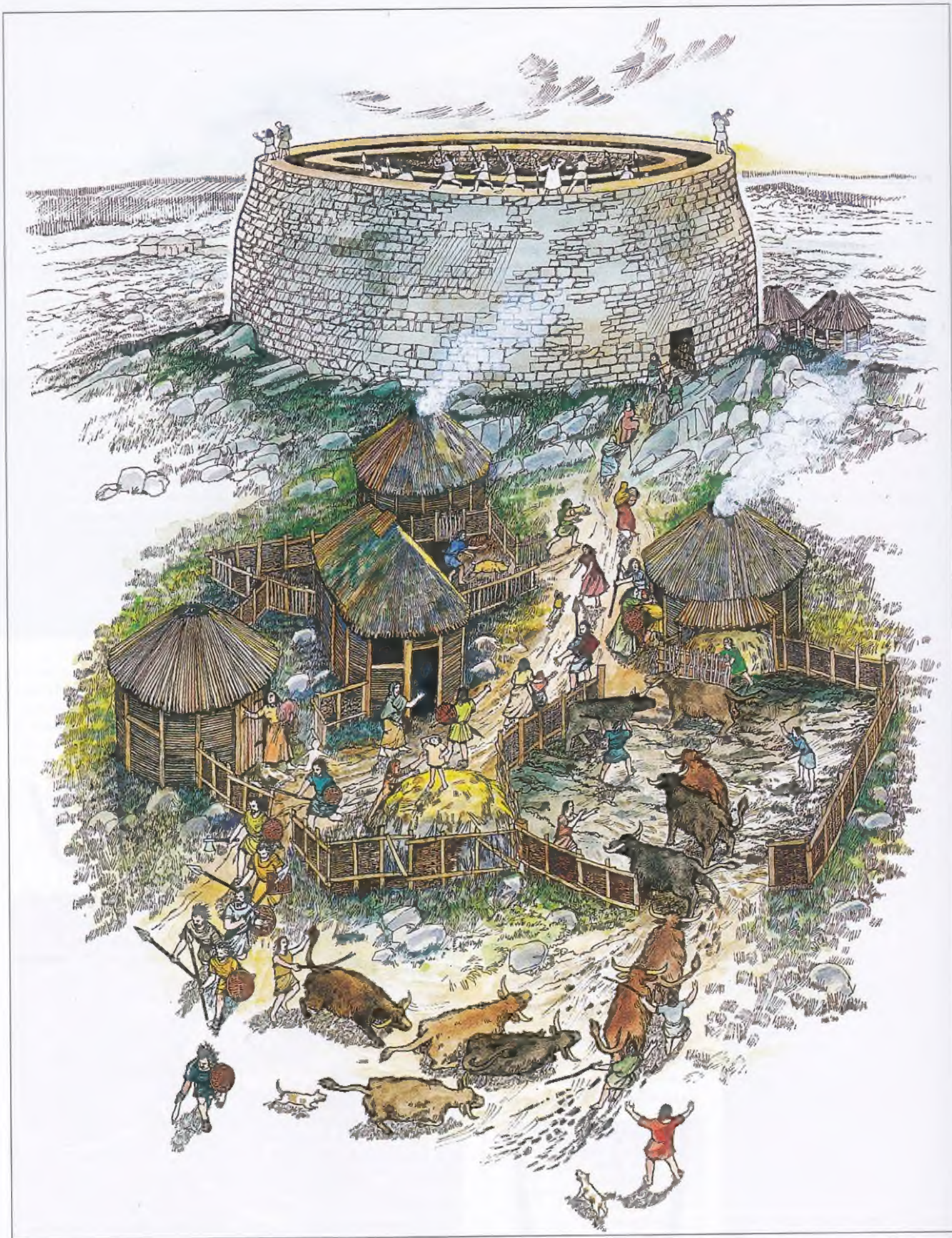
■ The remains of a broch settlement in Orkney.

until around 400 BC that the more complex architecture began to evolve.

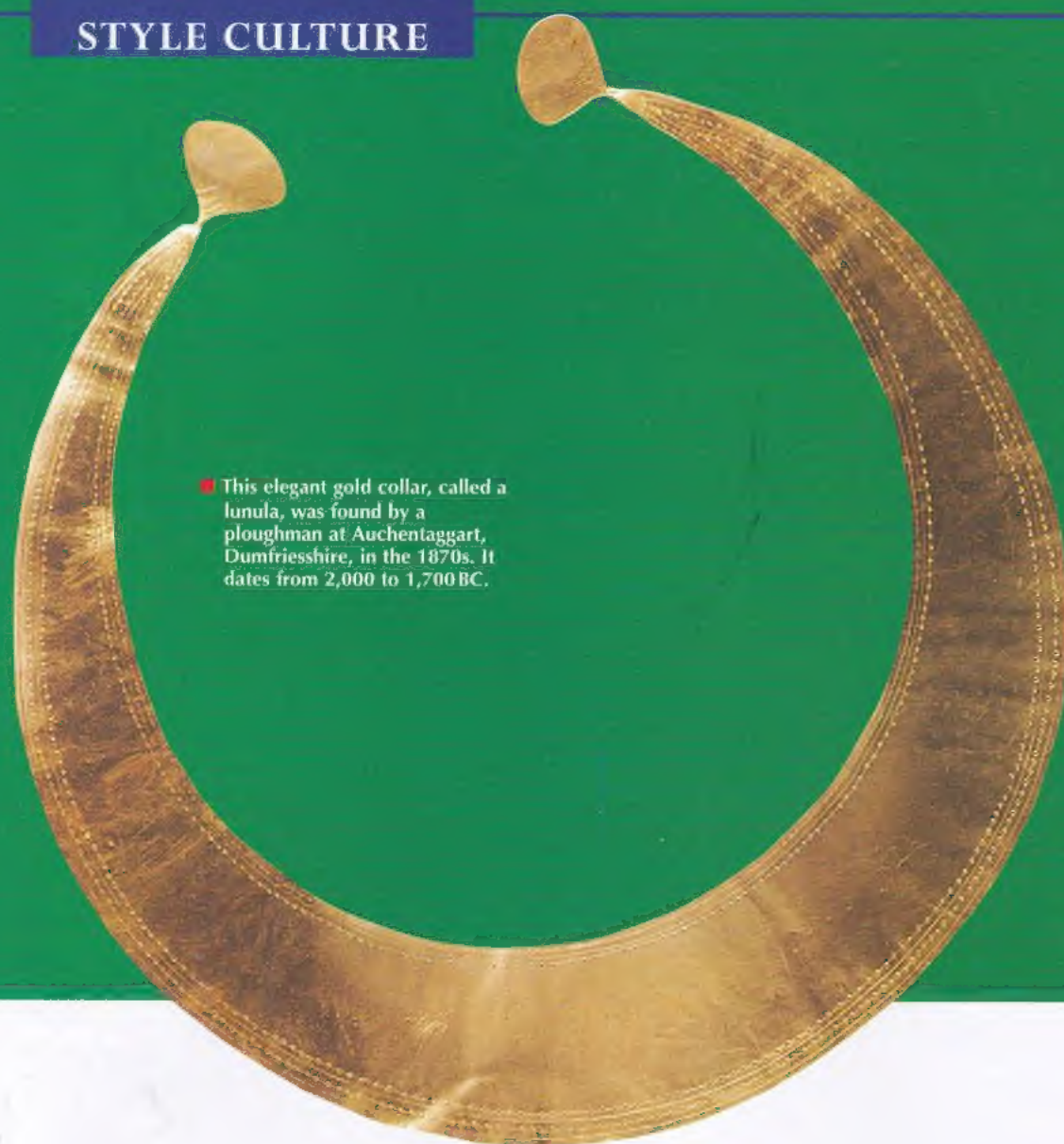
The people who built them were the descendants of the farming and fishing communities who had inhabited the Highlands and Islands for centuries.

These communities took the fashionable roundhouse form and, using their skills in drystone building, fashioned a unique and monumental architecture.

By around 200 BC the first broch towers began to appear. In Orkney, there are some, like Midhowe on



■ A broch tower appears to have been the centrepiece of most prosperous Iron Age farms, like this one on Skye.



■ This elegant gold collar, called a lunula, was found by a ploughman at Auchentaggart, Dumfriesshire, in the 1870s. It dates from 2,000 to 1,700 BC.

The aristocrats of Bronze Age Scotland were as fashion-conscious and flamboyant as today's designer-label generation

Jet set jewellery

The skill of ancient jewellers and the vanity of the Bronze Age aristocrats who commissioned their work have proved to be a winning combination for archaeologists.

Hordes of the treasures they created have survived through the ages to give a wonderful insight into their lifestyles and vanities.

The Bronze Age silver and goldsmiths were skilled craftsmen producing an impressive body of work, armed only with the simplest of tools and a lot of elbow grease and patience.

But many of their designs display as much style and flair as modern pieces.

The range of Bronze Age Scottish jewellery and dress accessories, recovered down the years includes

everything from the sheet gold hair decorations of 2,500 BC, to the exquisite chunky amber necklaces of around 750 BC.

The aristocrats of Bronze Age Scotland were just as discerning and fashion-conscious as today's young people. And although the pace of the style wars was more sedate – with archaeologists measuring change over centuries, rather than seasons – the cachet associated with wearing the

latest exotic novelty was just as great.

Most of the jewellery dating from 2,500 to 500 BC consists of adornments for the neck and arms: fancy hair accessories, necklaces and collars, bangles and bracelets.

These were made from a variety of precious and often imported materials. Gold – mostly from Ireland – was popular throughout the period, and was used in a variety of ways.

The earliest pieces, the basket-shaped hair ornaments and collars known as lunulae, were made of sheet gold, decorated by engraving or by punching up 3D designs. The Minch torc, made around 1,000 years later, was made from a twisted solid bar, fashioned with heavy, solid end-pieces expertly soldered on.

And some 500 years later still, we

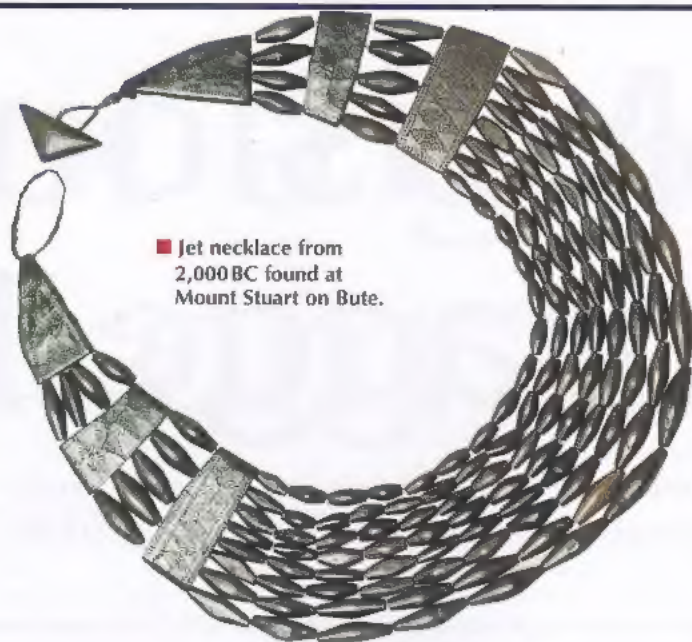
find sheet gold, solid cast gold, and also gold foil – the foil being wrapped around bronze hair rings, to make them resemble solid gold.

Jet, the semi-fossilised remains of the monkey puzzle tree, had been in use in Scotland from 3,500 BC. But it became the must-have material from around 2,200 BC when, among other items, it was used to make the superb, lunula-like spacer plate necklaces for high-status women.

The only major source of true jet in Britain is at Whitby in Yorkshire, and there specialist jewellers developed a thriving export trade, supplying the needs of wealthy Scottish farmers and entrepreneurs. Jet was highly desirable not just because of its beautiful black colour and ability to be polished to a lustrous finish.

■ A child's disc bead necklace found at West Water Reservoir in Peeblesshire.





■ Jet necklace from 2,000 BC found at Mount Stuart on Bute.

It was also a magical material – if you rub it against your clothes, it picks up an electrostatic charge and can attract light materials.

Jet has traditionally featured in folk beliefs as having magical or healing properties. The Romans believed it cured women's problems, and the Vikings made good luck snake amulets, in the shape of the fossil ammonites that are found with the jet at Whitby.

So popular was jet jewellery, that people copied it in coal, shale and lignite. They also used these materials to carry out home-made repairs when a bead broke.

Jewellery of jet and jet-like materials includes necklaces, bracelets and dress accessories. One little disc bead necklace, found in 1992 around the neck of an infant in a stone cist grave at West Water Reservoir in Peeblesshire, even had a second strand of tiny lead beads – marking the earliest use of worked lead in Britain.

Amber, the fossilised resin of pine trees, was also treasured for its beauty and electrostatic properties. Originally from the Baltic, some amber has been found washed up along the eastern coast of Scotland and England. But it's likely that most of the Scottish amber finds had been imported.

A set of three beads, shaped like miniature battleaxes, were found with cannel coal copies in Lanarkshire last century, and these may have been imported from the Low Countries around 2,500 BC.

From a remarkable cist burial in Orkney come amber dress accessories and a fragment of a spacer plate necklace, dating to around 1,750 BC. These necklaces – copies in amber of the jet ones, and ultimately copies of gold lunulae – have an extraordinary story to tell. They were probably made in Wessex at the time of Stonehenge, using amber imported from Denmark. Finished necklaces were then used locally, and were also

exported to Europe – ending up in the famous Shaft Graves of Mycenae in Greece. The fragments found in Orkney had also probably been made in Wessex, nearly 1,000 kilometres to the south.

The beautiful amber necklaces of the Late Bronze Age had also done some travelling. Made of Baltic amber, they were among the trade goods which moved between northern Europe, Scotland and Ireland in the centuries after 1,000 BC.

Faience, a glassy material made from sand and coloured bluish-green by a metallic glaze, was the latest craze around 1,750 BC. Scottish craft specialists learned how to make faience beads from their counterparts in Wessex, but the technology had originally come from the Middle East, centuries earlier. At Findhorn, in Moray, a mother who had died in childbirth was buried with a necklace of these precious beads.

Bronze was also used for jewellery, and examples include a beautiful bangle – one of a pair, the other lost last century – found in a cist grave at Melfort in Argyll. This had been found with a spacer plate necklace, and the design on the bangle resembles the beads in the necklace.

Dress accessories were as important as jewellery in showing off the status of the wearer.

Ways of fastening clothes varied over time, with buttons being replaced by pins and other fasteners. Conical buttons of jet and similar materials were a multi-purpose, unisex accessory from around 2,200–1,700 BC.

Pins came in a variety of shapes and sizes. The massive bronze sunflower-headed pins of the Late Bronze Age were probably worn with their points upwards, over the shoulder.

Other cloak and sleeve fasteners, made of gold and mostly imported from Ireland, were used at this time. So, following the latest fashions from the Continent has a mighty long ancestry.

What Bronze Age folk might have thought of a Vivienne Westwood or an Alexander MacQueen outfit, we can only speculate.

But in their way, they were every bit as fashion conscious and as flamboyant. ●



■ Gold hoard of hair ornaments and bangles discovered in Easter Ross.

Magic of the metals

THE first time man turned a jagged rock into a shiny new material ranks alongside the discovery of fire or the invention of the wheel as a milestone in human progress. Metal's arrival in Scotland, shortly after 2,500 BC, changed people's beliefs, the way they did business, and how they fought their battles.

Owning a copper-bladed dagger or a magnificent golden moon-shaped collar was a new and compelling form of one-upmanship. Metal objects such as jewellery, weapons and axeheads made of copper, bronze and gold from Ireland and across the North Sea, and the know-how to make them, had a profound effect on the power structure, economy and trading patterns.

Metalworking centres sprang up around Grampian, Moray and the Cromarty and Dornoch firths. In the West, the Kilmartin Valley was an entrepreneurial centre where tombs were decorated with the latest symbol of power – carvings of metal axeheads.

Metal brought prosperity and luxuries – domesticated horses, imported drinking vessels and new archery gear featuring a short, composite bow, wrist-guards and smart belt fittings.

Some metal workers moved to Scotland prospecting for new supplies or aiming to meet market demand. Areas less able to participate in the new power games, such as Orkney, became marginalised, but Scotland occupied a key position in the international metal trade between copper and gold-rich Ireland and metal-poor northern Europe.

Around 700 BC, a new metal came on the scene. Iron's raw material was far more abundant, and the finished product much tougher. It hastened social and economic change, as bronze objects were off-loaded and traditional networks of contacts withered.

■ Bronze sword found on Arthur's Seat in Edinburgh.

A vision dragged

Among the shellfish something gleamed... and brought us the skills of craftsmen 3,200 years ago

It was just another day on board the Favour, and just another catch of scallops being hauled aboard the wind-battered fishing boat.

But something was glittering among the day's catch... something metallic and gold-coloured.

Fisherman Kenny Cunningham looked at it quizzically for a moment. He thought he'd dragged up a bit of brass bedstead from the treacherous Hebridean waters of the Minch. Then he tossed it into his toolbox beside some old spanners.

It was more than a year later that Kenny discovered his piece of junk was, in fact, one of the most exciting archaeological finds ever made in Scotland. Languishing unrecognised on his boat was a 3,200-year-old necklet, fashioned out of incredibly pure gold by a craftsman in the Bronze Age.

For Scotland, it is unique, a complete one-off. Old records tell us that three other torcs, as they are called, have been found in Scotland but not one has survived. Copies were made of two, but all three originals were lost or perhaps melted down. Anyhow, they've vanished for ever.

And that could easily have been the fate of the torc Kenny Cunningham

found, two miles off the Shiant Islands. But by chance, the 38-year-old fisherman switched on the television one night in his Scalpay home, and found himself watching The Antiques Roadshow.

Kenny recalled: "They were doing an item about torcs, and I thought 'that looks like the thing I've got in the tool box'. I wasn't certain it was still there and thought I might even have chucked it over the side. So I rushed to the boat – and there it was."

Two weeks later, he took the necklet to Christie's, the auctioneers, in Glasgow. The excited look on the expert's face, as she caught her first glimpse of his find, told Kenny all he needed to know.

The unique and beautiful object he fished up is like a spirally-twisted ring with two plain rods soldered on to the ends, for Bronze Age craftsmen could indeed do a kind of soldering. Torcs – from the Latin



■ Teena Ramsay's modern interpretation of an ages-old design.

Born again out of silver

We asked jeweller Teena Ramsay to explore the skills required to make the ancient Shiant torc by creating a modern representation in her Edinburgh workshop.

She settled for using silver, and modern equipment such as a blow-torch, a hand drill and an electric polishing machine. And she had an easier starting point.



While the Bronze Age craftsman began with raw nuggets of gold, Teena could simply place an order for square-section silver wire and rods – and pay by credit card.

She clamped four thin pieces of the wire into the chuck of a hand-drill. The wire was heated, or annealed, to make the metal workable, then she turned the



drill to produce the required twist – a process which did not require the sheer strength of

grip needed by the Bronze Age worker. To make the terminal decorations for her necklet, she sawed off two lengths of rod, annealed them,

and forged each into its tapered shape on an anvil. The metal had to be annealed over

of a golden age from the sea

torque, to twist – could have been either neck or arm ornaments. In fact, larger ones could even have been worn as belts.

Kenny's torc had lost its shape after centuries of buffeting on the seabed, but its size suggests to experts that this was a neck ring, with just a possibility that in an original, more tightly-coiled form it could have fitted on an arm.

Today, the torc has pride of place in the Museum of Scotland, in Edinburgh, and Kenny and his crewmate, Donald

MacSween, have shared a £50,000 award from the museum, paid through the official

Receiver of Wrecks.

The treasure from the Minch has found a new resting place, but many mysteries surrounding it have still to be solved.

Trevor Cowie, a curator at the National Museums of Scotland, described his sense of wonder on

examining the piece:

"Once upon a time, somebody owned it, wore it and was proud of it. Somebody

probably told stories about it. It may have been worn on special occasions,

perhaps at weddings, funerals, or feasts."

The owner was probably rich and powerful. But no one has ever been found buried with this type of jewellery, so it's not certain whether it was worn by a man or a woman.

As for where the torc came from, the mystery deepens, although researchers and metallurgists have been seeking the answer. Trevor Cowie thought it was probably not crafted in Scotland, but rather in Wales, Ireland or southern England.

The metal has been analysed and found to be gold of the highest purity. The results are now being compared with analyses of other goldwork of the period. Bronze Age people did cross the seas to trade, and the torc could have been imported to Scotland as a wedding gift or to seal a friendship between chieftains.

It may have gone to the bottom of the sea with its owner in a shipwreck. However, it has been impossible to pinpoint exactly where the torc was dredged up, so it is very difficult to launch a search for an ancient wreck.

Indeed, the torc may have been cast overboard deliberately as a religious offering. What does seem certain is that a sea trip was involved. There has been some coastal erosion in the Shant Islands over the last three millennia, but it is unlikely that the torc was lost, left, or last seen, on dry land.

■ Kenny Cunningham, left, and Donald MacSween had no idea that a priceless gold necklet lay in the toolbox, until Kenny found himself watching *The Antiques Road Show*.



■ The torc from the Minch. When the metal was analysed it was found to be gold of the highest quality.



■ No doubt the Bronze Age craftsman would have found Trevor's inspiration.



Beware the Blue Men

The three Shiant Islands, where the amazing find of the priceless gold torc was made, lie in the waters of the Minch, east of Harris, and are known in Gaelic as the enchanted isles. Strong tidal currents are not the only hazard facing those who venture into these waters

Legend has it that the Blue Men of the Minch live in the Sound of Shiant, and that they are either fallen angels who landed in the sea after being ejected from Heaven, or storm kelpies

Sailors are advised to treat the Blue Men with great respect. They should speak to the Blue Ones in rhyming Gaelic couplets, or else be dragged to the bottom of the Minch

A minister in the late 19th century recorded his meeting with one them. He said "a blue covered man, with a long, grey face, and floating from the waist out of the water" came so close he could almost touch him

The strikingly attractive Shiants are a cluster of three islands and several islets made of basalt formed by the eruption of the Skye's volcano when Scotland and America split apart.

This has produced spectacular, natural columnar structures similar to those of Staffa and the Giant's Causeway, which are of great interest to geologists and lovers of the picturesque

The main island is divided into two parts connected by a narrow neck of pebbles, which is covered by the sea during high tides or storms. In

The Shiants harbour tales of a tragic family, of Compton Mackenzie, and of rats galore...

the 1690s, Martin Martin, the Presbyterian folklorist, said he had seen carvings made from the blue stone found there and noted the islands' fertility

Mary's island is the most fertile of the three, surrounded by steep-sided cliffs with a rock stair leading to an arable plateau where farmers grew corn and grass and built a chapel to St Mary before the Reformation

By the late 18th century, the only inhabitants of the main island of the Shiants were a shepherd and his family of four. But in a succession of appalling tragedies, the entire family was wiped out. First, the mother and only son fell to their deaths from the high cliffs while trying to drive sheep to safer grazing. Next, a daughter perished while collecting birds' eggs and the father died of a broken heart

This left one daughter alone on the island. Ten days went by before the weather was calm enough

for her to try to row to Harris, a dangerous 12 mile crossing. She never made it back and the family's last survivor was never seen again

In the 1820s, the tacksmen of the notorious Park estate on Lewis severely punished any fisherman who made the hazardous landing on the Shiants. It was assumed they were stealing sheep

The islands were bought by Sir Compton Mackenzie in 1925 and sold 12 years later for £14,000 to the Nicolson family, which still owns them. They have been uninhabited since 1910, but by then the main island had been rat-infested for more than 30 years. Sir Compton imported cats to try to rid the island of the infestation but, so the story goes, the rats ate all the cats

The next plan was to lay down rat poison, as had been done successfully on Ailsa Craig, off the Arvrshire coast. But then it was realised that these were not common brown rats but *Rattus rattus*, the old plague rats of medieval times.

As these black rats were no longer common in the British Isles it was decided to declare them a protected species. Now the rats, puffins which are also protected and many species of birds live in relative harmony, untroubled by humans

How to get there

There is no regular access to the Shiants. Irregular crossings are made from Scalpay to tend sheep. Excursions can be made by special arrangement through Sea Trek, Uig, Lewis. Telephone 01851 672464

This wooden goddess, found at Ballachulish, was worshipped by Bronze Age man in Scotland.

Gifts for the goddess

Though Bronze Age man coveted his luxuries, sometimes they had to be surrendered ... to the gods

To men in the Bronze Age, just as now, the material world was everything. Three thousand years ago, to own a thrusting spear with a bronze spearhead so long it was effectively unusable was a terrific status marker. The practice of showing off by using tools and weapons which were bigger and better than normal has a very long history.

People were proudly brandishing gigantic stone axeheads imported from Cumbria more than 5,000 years ago: objects so large and precious that they could only have been for ceremonial use, and for show. Unwieldy giant daggers, called *dirks*, were being waved around in games of one-upmanship around 1,500 BC. But by around 1,200-700 BC, the better-off men in Scotland were indulging in very elaborate power games.

And, in far-off lands around the same time, the people who inspired Homer to write about Odysseus and his heroic acts of combat were doing something very similar. In fact, Europe at the time of the mythical Odysseus was full of armed men, showing their military prowess in set-piece battles as well as fighting in earnest.

The weapons used by late Bronze Age warriors consisted of a long slashing sword, a round shield, and spears for thrusting and throwing. Elsewhere in Europe, people were using body armour consisting of elaborate helmets – including the famous, and definitely not Viking, horned helmets of Denmark! – and metal jackets and greaves (shinguards). But none of this body armour has so far been found in Scotland.

The long swords would have been equally good for use on foot or on horseback, and their slashing blades were capable of inflicting serious injury and death. Microscopic inspection of many blades has shown that they saw serious use, so they were not just for show.

That horses did form part of the late Bronze Age warrior's

Symbols of power



Left: A bronze shield from Yetholm, Roxburghshire, dating to the 10th century BC. It is elaborately decorated, and was probably made for display rather than war. Right: These bronze offerings to the gods include spearheads, daggers, bracelets, pins and decorative axeheads.

aristocrat's possessions is shown by fancy pieces of horse trappings, found in hoards such as the St Andrew's hoard. But whether they were used to pull two-wheeled battle chariots, as in contemporary Greece, we don't know. The only wheels of this period to have been found in Scotland came from a heavy farm wagon.

What we can say is that set piece combats between competing wealthy 'heroes' did take place in Scotland 3,000 years ago. The superb sheet bronze shields which have been found in bogs were masterpieces of the bronzesmith's art, and their thousands of decorative bosses would have taken days to make. But as functional defensive shields, they would have been useless.

Experiments by John Coles, formerly of Edinburgh University, in the 1960s demonstrated that a single blow from a sword could slash the thin bronze. We know that, for practical purposes, leather shields were used. One such shield, and a wooden mould used for shaping the leather, have been found in Ireland, and one day somebody might find examples of these in Scotland. So we can imagine that the bronze shields featured in spectacular mock battles, where the combatants were cheered on by their supporters and where

no real harm was done. The aristocrats of

Late Bronze Age Scotland had

other ways of showing off their wealth and power. Acts of conspicuous consumption are known, with legendary feasts being thrown to entertain and impress friends and former enemies alike. In the Museum of Scotland you can see an entire feasting kit dating from around 750 BC. A bronze cauldron would have been used to boil up large joints of meat, and a dainty bronze flesh fork would have lifted the pieces out to the waiting guests.

Alcohol, in prodigious amounts, would have been served from large bronze buckets, ladelled out into beautiful cups and drunk to abandon. The most likely drink would have been ale or mead. Elsewhere in Europe, wine was drunk, but that didn't reach Scotland until centuries later.

The cauldrons, forks, buckets, ladles and cups all echo fashions elsewhere in Europe, and the original inspiration for the buckets can be traced right back to Hungary and beyond. Although there aren't any exact parallels for the exquisite ladle found at Corrymuckloch in Perthshire,

fancy ladles were part of the contemporary feasting kit in central and south-east Europe and northern Italy. Whoever was responsible for having the ladle made realised that it would be a prestigious and valued possession – rather like Danish designer cutlery today, but even more precious.

Conspicuous consumption was also a prominent feature of the relationship between the aristocracy and the world of the gods. Great votive offerings were made as gifts to the gods of watery places, or of craggy glens. Large amounts of precious objects were sacrificed in set piece ceremonies. Often objects were deliberately broken, and sometimes even burnt, as a way of removing them from the world of the living – and ensuring nobody else would come along and fish them out again.

Just as wealthy benefactors today might give fortunes to churches, the well-to-do of Bronze Age Scotland demonstrated their piety by giving away what was precious and valuable. But these acts were not just devout. They also signalled, loud and clear, that the giver was a very important and wealthy person, to be respected.

In some cases, even less noble motives may have been in play. From around 700 BC, when the first items of an exotic new metal, iron, were beginning to be imported from Europe, some



THE origins of Scotland's National Museum collection lies deep under the muddy waters of Edinburgh's Duddingston Loch.

Our Bronze Age ancestors, respectful of the gods, threw precious artefacts into the loch, which lies at the base of Arthur's Seat, as a sacrifice. Today, around 50 of these pieces still survive.

The hoard was found by chance in 1780 as

a local landowner had the loch dredged for marl to spread on fields to help his crops.

Various items were found, including a handle of a feasting bucket, and weapons such as spearheads and swords.

Other artefacts, including two bronze swords, were recovered from slopes nearby and date back to around 750 BC. Tribesmen,

who had possibly lived and farmed around Arthur's Seat, are understood to have been responsible for the gesture, and the sacrifices came at a time when iron was beginning to be used and people wanted to dispose of their bronze.

Sadly, human remains also dredged up from the loch at the time were not kept, a

Edinburgh loch gives up its

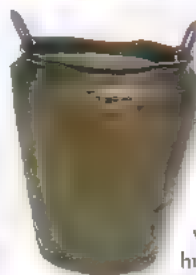


people quickly realised that bronze would lose its value. So by getting rid of large quantities in votive deposits, they ensured that they wouldn't get left with unwanted goods. This just goes to show that human nature never changes

But what about the gods and goddesses who were the recipients of these gifts? Because the people were not literate, we have no indication of their belief system other than the objects which come down to us. Miraculously, we do have one remarkable example of a carving, made of alder, believed to represent a watery goddess. It was found during peat cutting at Ballachulish, Inverness shire, in 1880. Unique in Scotland, it is one of a series of wooden figures from first millennium BC Europe.

A photograph taken just after it was found shows that the figure was virtually naked, with her hands extending over her midriff, and with her right hand holding something indistinct. Poking up from what looks like a low slung boob tube is something resembling an arrow, and a strap seems to run over one shoulder. The figure has quartz pebbles for eyes, and it had originally been fixed

■ A carving of a goddess
found during peat cutting
at Ballachulish



into the ground. It stood at the edge of a pool or mire, overlooking the treacherous straits which link Lochs Leven and Linnhe. Is it too fanciful to imagine it as a prehistoric version of Our Lady of the Straits, protecting sailors as they passed?

When the figure was found, it was face down, and a mass of branches and twigs were around and over it. These were not kept, so we don't know whether these represented a kind of wickerwork niche or shelter for the figure.

An alternative theory sees it as something specially pinned in place, to keep the figure down in the water when it was deliberately toppled. Cases where human sacrifices have been pinned down using stretches of wattlework are known from a few centuries later in Britain.

We can only piece together fragments of the religious beliefs of Bronze Age people. But the practice of sacrificing valuable objects to the gods and goddesses of water was to remain an active tradition until the very recent past. What are our wishing wells, if not faint echoes of a pagan belief in watery spirits?

pagan hoard

disappointment for today's experts who, using the latest scientific techniques, could have gained valuable clues to their origins.

The treasure trove was named the Duddingston Hoard and was initially divided up and given to several people, including King George III, Sir Walter Scott,

and Sir Alexander Dick, the owner of the land, who donated his part to the newly-formed Society of Antiquaries of Scotland.

The comprehensive National Museums of Scotland collection has been built-up over more than 200 years. Archaeology, decorative and applied arts, coins, social and military history, the history of science and technology, agriculture, geology and zoology, are all covered in the Royal Museum and Museum of Scotland in Edinburgh.

TIMELINE

2,500-2,300 BC

First metal objects imported into Scotland. The Bronze Age begins.

2,100 BC

Mesopotamian mathematicians divide a circle into 360 degrees.

1,700 BC

Earliest known Chinese script.

1,323 BC

Tutankhamun is buried in the Valley of the Kings, Egypt.

1,200 BC

The population of Memphis, Egypt's capital city, reaches one million.

776 BC

First Olympic Games held in Greece.

753 BC

The traditional date for the founding of Rome.

750 BC

Greek poet Homer writes the Iliad and the Odyssey epic poems. And the Duddingston Hoard is sacrificed to the spirits of the loch.

700 BC

The Iron Age begins in Scotland.

600 BC

The lifesize Ballachulish figurine, pictured on page 13, is carved.



More than 50 Bronze Age artefacts have been found in Duddingston Loch at the foot of Arthur's Seat in Edinburgh.



The Em

IN 79 AD, 36 years after the Romans had entered Britain, Governor Julius Agricola set his sights on conquering the Caledonian tribes of the North. For five successive summers Agricola led the Roman army against the Britons in North Wales, North West England and Southern Scotland, until he had secured the whole of the island as far as the Forth-Clyde line.

In the summer of his sixth year he moved against the tribes of the North and two civilisations became entangled in a deadly struggle.

It was a battle the Romans would never fully win.

Debate has raged over why they failed to conquer our Celtic Caledonian ancestors. It seems likely that this failure was more due to the internal politics of the Roman Empire than the prowess of Scotland's Celtic warriors.

Popular mythology would have us believe the Romans entered a dark, tree-covered land full of barbarian Celts. But that is just the Roman view of Scotland past, a land full of uncivilised barbarians.

In fact, the Romans attacked a sophisticated Celtic culture that was no doubt well aware of the Romans' reputation. These Caledonians chose not to be part of the Roman Empire, a price many must have paid

with their lives. After many skirmishes, Agricola's army finally met the Caledonians at the Battle of Mons Graupius, late in the summer of 84 AD.

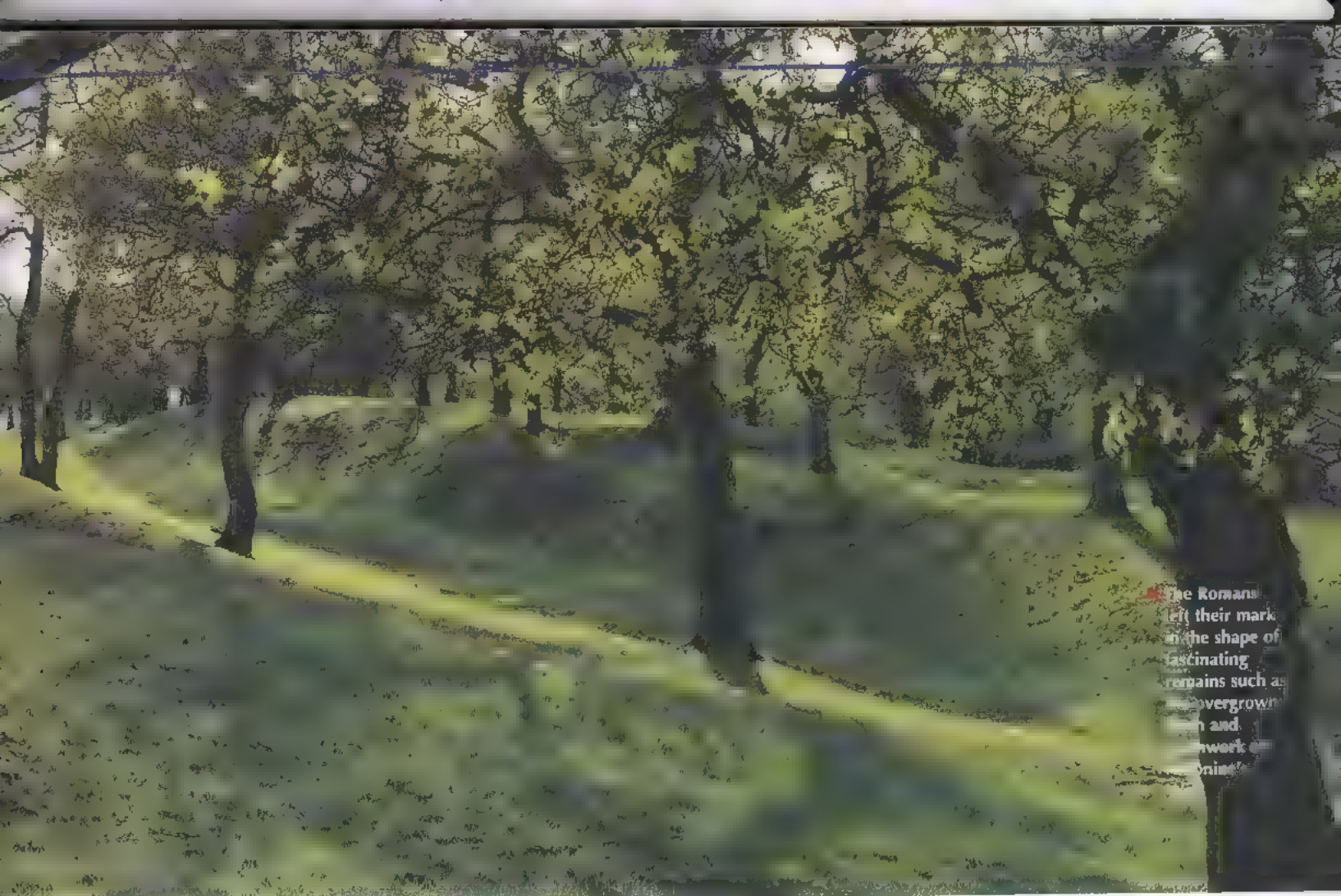
The Caledonians considered themselves to be the last men on earth, the last of the free. This was Scotland's first fight for independence.

A remarkably detailed account of the Mons Graupius battle has survived, written in AD 98 by the distinguished Roman historian Cornelius Tacitus. What makes this such a valuable source is that the author was married to the daughter of the commander of the Roman army, Agricola.

Tacitus wrote his glowing biography within a few years of his subject's death and must have known a great deal about the man and his campaigns. But Tacitus's aim was not a rigorously factual version of events. Instead, he tried to present his honourable father-in-law in the most glorious light.

In any case, his Roman readers were not interested in details and, to the frustration of modern scholars, Tacitus spared them the names of people and places they had never heard of.

Tacitus's eloquence is seductive. It's all too easy to take his version of events at face value. Of course there was another side to the story, but the



The Romans left their mark in the shape of fascinating remains such as overgrown ruins and a network of Roman roads.

Empire invades

Scotland's first battle for independence is fought as the legions advance on the North

Caledonians left no written documents and it is difficult to find anything with which to balance the Roman view of events. Archaeology provides us with some important clues, but our only real hope is to read between the lines of the Tacitus account. Agricola sent the Roman fleet ahead to survey the coasts. The arrival of naval forces shocked the Caledonians into realising that neither their remoteness from the south nor the challenging nature of their terrain would protect them from Roman aggression.

According to Tacitus, they attacked Roman forts and "turned to armed resistance on a large scale". This caused great alarm within the Roman command. Some lobbied for a strategic retreat back south of the Forth, arguing that evacuation was preferable to expulsion. Agricola ignored these appeals and instead moved his army forward. In response the Caledonians led a secret night attack against the Ninth Legion. Had Agricola not been tipped off and sent his fastest cavalry to the rescue,

the Roman legion would have been wiped out. Both sides took heart from this narrow escape knowing that it was only a matter of time before the two sides would meet in a full battle.

The Caledonians continued to arm themselves. The various different tribes or 'nations' joined together, uniting against the common enemy. Their treaties were sealed with solemn religious ceremonies. Women and children were sent to places of safety. News reached the Caledonians that a group of German soldiers, the Usipi, within Agricola's army had mutinied and taken off in three warships. This gave the Caledonians renewed hope. They knew that in reality the Roman army was a motley conglomeration of troops recruited throughout the Empire and beyond. In addition to the highly trained legionaries there were also large bodies of auxiliary troops. Agricola's auxiliary forces included Batavians (Germans from the area of modern Holland) and Tungrians (Celtic-speaking Gauls from eastern Belgium). The Caledonians would have hoped

perhaps that they would have followed the example of the Usipi and deserted the Roman ranks. No serious campaigning could happen during winter but at the beginning of the next summer season Agricola reinforced his army with Britons of known loyalty from further south. His troops advanced on land while the fleet went ahead to plunder and spread fear. Agricola and his men marched on till they reached Mons Graupius "the Graupian mountain".

Quite where this is, we don't know [see next page] but the site must be somewhere in the North East along the line of Roman advance which is marked in the archaeological record by a string of forts and marching camps. This route leads from Strathcarn along Strathmore, across the Mounth north of Stonehaven, then following the line of the A96 by Inverurie and Huntly down into Moray. Wherever the exact site of Mons Graupius, it was the place chosen by the Caledonians for their last stand against Rome.

There could be no doubt that everything depended on the outcome of this great confrontation. Every available fighting man stood ready, awaiting the Roman advance. Tacitus claims the Caledonian forces numbered 30,000 which ▶

A battle with no address

MANY theories exist over the venue for the Battle of Mons Graupius, but none is conclusive. More than a dozen places are rumoured to be the correct site – the more imaginative include the Gleneagles golf courses and the vicinity of Culloden.

The name of the battle implies an isolated or at least distinctive hill, in other words not the whole range of the Mounth.

In the first printed edition of Tacitus's work, in 1480, a printer's error caused Graupius to appear as Grampius, which means the region Grampian took its name from a 15th-century spelling mistake.

The very detailed description by Tacitus of the battle gives some clues regarding the lie of the land. The hill itself must have had a concave and rather steep slope. There was an open place for the Roman camp and a plain beside it with wooded hills nearby and a Caledonian settlement within view.

Serious contenders for the site include:

- Duncrub near Dunning in Perthshire – may contain a linguistic echo of Graupius and there is a Roman camp nearby, but it seems rather too far south.
- Raedykes, just north of Stonehaven – Roman camp and a strategic location but doesn't fit description of topography.
- Knock Hill, Pass of Grange, north of Huntly – a strategic location near the most northerly marching camps.

- Bennachie, by Inverurie – perhaps the strongest contender. The great Roman fort of Durno is nearby and there are impressive native fortifications on the top of the hill.

The topography fits well and it is a location of great symbolic importance. Ritual monuments in the vicinity stretch back to the Neolithic and forward into the Pictish periods.

The last of the free

► seems an incredible number but may be only a slight exaggeration. As the two sides faced one another across the battlefield the Caledonians had several advantages. For a start they had greater numbers. More importantly, perhaps, they were on home territory, with not only an intimate knowledge of the landscape but also a concrete reminder of what they were fighting for. They knew very well what had happened further south. They knew they had everything to lose. The Roman forces on the other hand were fewer in number. Its troops were far from home and fought for booty and glory. Agricola addressed his troops, firing them up with reminders of their own battle-honours. He pointed out that defeat deep in alien territory would be disastrous but even death in this remotest of places would bring great honour to the valiant.

As the opposing armies drew up their battle lines, the Caledonians stood on the higher ground in close-packed tiers up the slope of the hill forming a most imposing and intimidating array. British charioteers careened back and forth in the open space between the two sides creating a great din with their cries. Their amazing feats of skill and bravery were intended to inspire the Caledonians and overawe the enemy.

Agricola now saw he was greatly outnumbered and ordered his troop lines to spread out, almost dangerously thin. He placed 8,000 auxiliary infantry in the centre of the front line and had 3,000 auxiliary cavalry on their flanks. Behind them were an unknown number of Roman legionaries who were to be kept out of the fray as much as possible (victory would be all the more glorious if achieved without the shedding of Roman blood). The fighting began with volleys of spears. The Caledonians showed great skill in deflecting Roman spears with their long swords and shields while continuing to rain down spears on the enemy.

At last, Agricola sent in 3,000 German and Gaulish auxiliaries "to fight it out at sword point". This was

a turning point. The Romans had a clear technological advantage with this move. The Caledonians used long slashing swords which could inflict terrible crushing injuries but were unwieldy at close quarters and little use against the short stabbing swords of the Roman troops. Caledonian war-chariots were also no match for the Roman cavalry.

All this time the Caledonian reserves on the high ground had been holding back and watching. Now they began to descend and envelop the rear of the Roman lines. But the outflankers were themselves outflanked by further Roman cavalry who had been kept in reserve. The Caledonians now realised that victory had slipped away. The Roman forces consisted of well-drilled and ferociously disciplined soldiers.

Antonine's Wall pushes

Within months of the Emperor Hadrian's death in July 138AD his successor, Antoninus Pius, ordered a new forward policy in Britain. He abandoned

Hadrian's Wall and advanced the frontier to the Antonine line. Here he ordered the construction of a new wall, known as the Antonine Wall. The wall stretched for 40

Roman miles across Scotland from Bo'ness on the Forth to Old Kilpatrick on the Clyde. It consisted of a turf rampart erected in a stone base 15 Roman feet wide. The exact



Calgacus The Swordsman rallies his brave troops

Tacitus dramatises the battle of Mons Graupius with the address to his army by the Caledonian general Calgacus. His name means The Swordsman, and he is the first native of Scotland whose name has been recorded.

"We are the last people on earth, and the last to be free. Our very remoteness in a land known only by rumour has protected us up till this day.

"Today the furthest bounds of Britain lie open – and everything unknown is given an inflated worth. But now there is no people beyond us, nothing but tides and rocks and, more deadly than these, the Romans.

"It is no use trying to escape their arrogance by submission or good behaviour. They have pillaged the world: when the land has nothing left for men who ravage everything, they scour the sea. If an enemy is rich, they are greedy, if he is poor, they crave glory.

"Neither East nor West can sate their appetite. They are the only people on earth to covet wealth and poverty with equal craving. They plunder, they butcher, they ravish. They make a desert and call it peace."

trained to fight in formation on the command of their superiors. The Caledonians were used to a different kind of warfare, one based on individual feats of bravery and skill. Their simple tactics aimed to instil paralysing fear in the enemy, but if the upper hand was lost there was little to fall back on.

Even though it was clear that all was lost, some Caledonians fought on with suicidal bravery. Others fled to nearby woods where their guerrilla tactics enabled them to ambush the first section of Romans who pursued them. Roman over-confidence at this point could have been disastrous had Agricola not sent infantry to ring the woods and flush out the enemy.

The Caledonians knew all was lost. They scattered in all directions, "deliberately keeping apart from each

other, they penetrated far into trackless wilds." The Romans continued to pursue them until nightfall.

Tacitus claimed that 10,000 Caledonians fell with a loss of only 360 Romans. Even though this will have been an exaggeration, it is clear Mons Graupius was a bloodbath. Tacitus paints a pitiful picture of the aftermath of the battle. Caledonian men and women, wailing together as they carried away the wounded. Many set fire to their homes rather than leave them to the Roman army, and some even killed their wives and children, so great was their dread of what might befall them.

The morning following the battle, Tacitus describes how "an awful silence reigned on every hand; the hills were deserted, houses smoking

in the distance, and our scouts did not meet a soul."

On both sides, people must have thought this cataclysmic encounter meant the end for the free Britons of Caledonia. However, the battle would have much less long-term impact.

The campaign season was almost over and Agricola moved his troops to winter quarters while the fleet sailed round northern Britain and "subdued" Orkney.

That same year, however, Agricola was recalled by the Emperor, and spent the last decade of his life in quiet retirement in Rome. Troops were urgently needed on the Rhine and Danube meaning the victory

at the Graupian mountain was never followed through.

Roman forces withdrew and the frontier was established much further south. In the words of Tacitus, Britain had been "completely conquered and then immediately let go."



■ A sheep is sacrificed at Arthur's Ovens, near Falkirk, in 1988.

the frontier north

height is not known, although it could have been 10ft. In front of the rampart lay a wide and deep ditch, the material from which was tipped out into the north side to form an outer

mound. The original plan for the wall included the construction of six forts at eight-mile intervals, each capable of holding a regiment. These forts were linked by a road called the

Military Way. The Antonine Wall began to be abandoned in 158, a process which may have taken years to complete.

Remarkably well, for example at

Bearsden a bathhouse and latrine can be seen. These are an evocative reminder that southern Scotland was once part of the world's greatest empires.

Turning the tide

The Picts emerge as major opposition, the mighty Empire begins to lose its grip and the end of Roman Britain becomes inevitable

The north west frontier of the Roman Empire for 50 years – from the 160s AD – was Hadrian's Wall. To the north, forts stretched as far as Newstead on the Tweed, which extended Roman surveillance, while treaties with the Caledonians brought their influence to the edge of the Highlands and perhaps even into that great wilderness.

The tribes had submitted reluctantly to Roman domination and the peace of the northern frontier was broken on several occasions.

In 208, the situation was so serious the presence of Emperor Septimius Severus himself was required as the Caledonians and the Macatae (whose name appears to survive in Dum Myot and Myot Hill near Stirling) fought a guerrilla campaign.

Although eventually the Caledonians were forced to sue for peace it was not long before they were rebelling again. Severus, now terminally ill, sent his elder son, Caracalla, to bring the northern tribes to heel, but with the announcement of his father's death in York, on February 4, 211, Caracalla brought the military campaigns to a speedy end, abandoning even the newly acquired territories and forts.

Hadrian's Wall again became the northern frontier and was to remain so for another 200 years. Some northern outpost forts continued in use, together with a scouting system, which lasted until 367 when it was also abandoned. So

far as we can tell, the northern frontier was peaceful throughout the third century, but in 297 we first hear a new name in the north – the Picts.

The descendants of the Caledonians and their allies, the Picts, were to develop into major and worthy opponents.

Three generations of emperors campaigned against them and in 367 the Picts and Gaels, then living in Ireland, and perhaps Argyll, led a great invasion against the northern extreme of the Roman Empire.

The Romans retrieved the situation, but their control was crumbling, and they faced further rebellion up to the end of Roman Britain in 411. But even then the Roman frontier seems to have continued to fulfil its purpose, because the Picts failed to secure a foothold in the shadow of Hadrian's Wall.

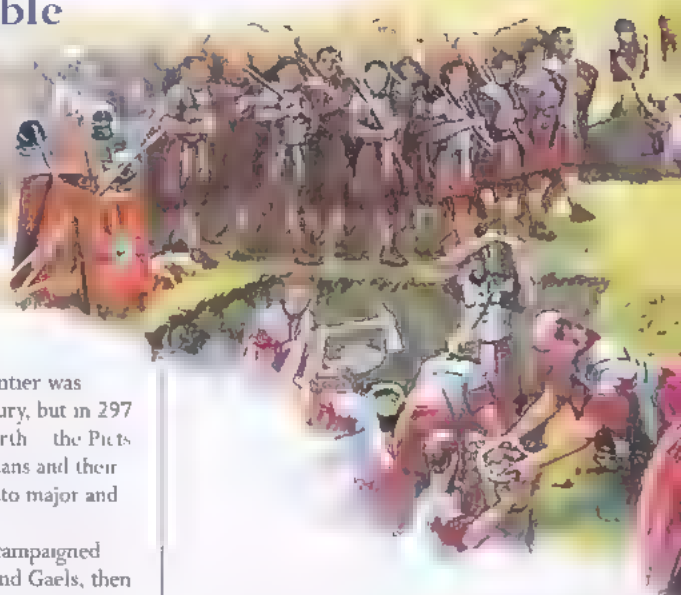
Why did the Romans fail to conquer Scotland?

For over 300 years, Scotland lay on the very edge of the Roman empire, most of it remained

unconquered and those forts which were subjugated were Roman for only limited periods.

Certainly, the expeditions which penetrated beyond the Forth met strong opposition. The terrain, too, was difficult, though the Romans had dealt with worse.

There seems to have been no economic inducement to conquest, not that the Romans appear to have thought in those terms. Perhaps, too, the political institutions of the Caledonians were insufficiently advanced to allow their easy absorption into the Roman empire. But the location of Scotland on the far north west frontier



THE PROBLEM WITH PONTIUS PILATE

Pontius Pilate has a lot to answer for. He is best known, of course, for allowing Jesus to be crucified, but he is also the central figure in one of Scotland's enduring conspiracy theories.

The story goes that Pilate was born in the village of Fortingall, Perthshire, the son of a Roman soldier who had a fling with a local woman called Menzies or McLaren. It's a good story, but there's only one problem.

According to all the evidence, Jesus was crucified around 33AD – before a Roman soldier set foot on Scottish soil.

Marching legions leave

The successive waves of Roman invasion left Scotland a rich heritage of sites and artefacts. Many artefacts survive today in our museums, and pride of place goes to the Museum of Scotland, where the collection of material from Newstead is on display, and the Hunterian Museum in the University of Glasgow, which includes most of the ornamental distance slabs from the Antonine Wall. The sites are spread across the

Scottish landscape and illustrate all aspects of Roman military life. During campaigns the army protected itself by constructing temporary camps, which consisted of nothing more than a single bank and ditch, with a series of stakes stuck into the top of the bank.

Within these defences each unit had its allotted space, the soldiers sleeping in leather tents. A later military writer states that a camp should not be occupied for more than two or three nights, because in that

time the army will have eaten all the food in the area and fouled its own water supply.

Remains of two Roman camps can be visited at Ardoch near Braco in Perthshire. Roman camps extend as far north as Speyside.

These camps, the largest of which cover 165 acres (66 hectares), are a useful reminder that although Roman writers repeatedly state the army had to toil through woods and marshes to seek contact with the enemy, the countryside was actually very open,

TIMELINE

79 AD

First Roman invasion of southern Scotland.

84 AD

Caledonians defeated at the Battle of Mons Graupius. Within two years the Romans give up Scottish conquests.

98 AD

Tacitus writes his famous account of Agricola's invasion.

122 AD

Construction of Hadrian's Wall begins.

142 AD

Second Roman invasion conquers southern Scotland. The Antonine Wall is built.

163-168 AD

Antonine Wall and southern Scotland abandoned.

180 AD

Northern tribes start to attack Hadrian's Wall.

208-211 AD

Emperor Septimus Severus campaigns against the Maeatae and Caledonians. He dies at York. His son Caracalla abandons Scottish outposts.

297 AD

First mention of the Picts in Roman sources.

305-306 AD

Emperor Constantius Chlorus campaigns against "Caledonians and other Picts" before dying at York.

360-383 AD

The Scoti, the Latin name for the Gaels, and Picts repeatedly attack the frontier.

396-398 AD

Pictish attacks on Roman Britain are countered by General Stilicho, the famous Vandal.

411 AD

The crumbling Roman Empire leaves Britain in control of its own affairs, and contact is slowly lost.

■ As the army moved around Scotland it set up walled bases called marching-camps to protect the leather tents of the legionaries.

of the empire and the internal politics of that empire also played a part

The first-century conquests were abandoned in the face of severe defeats on a frontier closer to the heart of the empire. The second century advance was limited in scope and may have been only to provide the new emperor, Antoninus Pius, with military prestige. The conquests of Severus were abandoned on his death by a son more concerned to consolidate his position in Rome

The Roman presence in the southern part of Britain and her interference in the north may have

had an unforeseen yet important result. The 12 tribes north of the Forth recorded in the second century gradually came together into two, then one: the Picts

This transformation may have been the result of an appreciation, subconscious no doubt, that large groupings were the only way to oppose Rome

In perspective, success was achieved because in the fourth century the Picts turned the tables on Rome. But, more significantly, the Romans unwittingly helped to create the kingdom of the Picts, which was to be the core of Scotland.

a rich legacy of forts

because it had been farmed for centuries

This fact is underlined by the later use of turf to build fort ramparts and even the Antonine Wall. It indicates the existence of larger areas of pasture, which has been reinforced by pollen analysis demonstrating that most of Lowland Scotland had been deforested by the time the Romans arrived

Following the successful subjugation of a tribe or group of tribes, the army erected forts. These

served two purposes - to control the new Romans and to protect them from attack

The visible remains of one of the most impressive fort sites in the Roman empire is at Ardoch. Here the ramparts and as many as five ditches survive of two or three successive forts. Elsewhere, the earthworks of long-abandoned fortlets and watch-towers are reminders of the might of the Roman army. They were linked to each other and to the province to the south by metalled roads. Civilians

followed in their wake and would have built shops, inns and houses in settlements beside the forts

One site lay at Inveresk beside Musselburgh. The settlement contained timber and stone houses, and even the remains of an amphitheatre have been found.

The balance of the diet appears to have been mainly vegetarians and, like soldiers everywhere, they shared a common pleasure when off duty. They enjoyed their beer and wine.

The Greek geographer Ptolemy recorded the names of 16 Celtic tribes in Scotland, including the Caledones, who gave their name to Caledonia. It was this Caledonian tribe who waged war against the legions of Rome.

Lost in the myths

The peoples the Romans found when they invaded Scotland would not have thought of themselves as Celts in any ethnic or cultural sense. Fierce entrenched rivalries existed between tribes. Indeed the Votadini, who gave their name to the Lothians, seem to have been allies of Rome at a time when the Caledones and others fought with the invaders.

Few prehistoric peoples have excited as much interest as the Celts. Now Celtic languages are spoken only on the north-west fringes of Europe. Scots Gaelic, Irish Gaelic, Welsh, Manx, Cornish and Breton – these are the sole survivors of a language family that once extended far across Europe, from Asia Minor to Spain, and from northern Italy to Shetland.

The origins of the Celtic languages, and the Celts themselves, are obscure and disputed. The traditional view was that the Celts were a distinct people who originated in Central Europe some time after 1,000 BC. During the Iron Age, they spread through invasion and colonisation across wide swathes of Europe, including Britain and Ireland. In 390 BC Celtic war bands sacked Rome itself.

Now, however, this vision seems less convincing. There is little to suggest that major population changes occurred during the Iron Age, and it seems more likely that Celtic languages simply evolved in the areas where they were



later to be documented – including Britain and Ireland. Some people moved around, but they did so within an already Celtic-speaking continent.

Celtic languages were spoken in Scotland as early as 325 BC, when a Greek writer called Pytheas referred to the Pretanic Islands and the Orcas (Orkney), both clearly Celtic names. Probably, however, these languages had been present for centuries before being incorporated in written documents.

Many archaeologists now believe that Celtic languages evolved during the Later Bronze Age, in the centuries around 1,000 BC. That was a time of intense contact between peoples. Vast trade links opened up to allow the movement of copper and tin ores, essential for making bronze. As these basic commodities moved, so did other items, including luxuries like cloth, gold, jewellery, and furs. People, too, moved along these trade routes, and with them

went myths, songs, stories, beliefs, and ultimately language.

The obvious links are in art. Celtic art is dominated by free flowing curving ornamentation, quite distinct from the more formal art of the classical world. Craftsmen employed complex swirling patterns and interlace to create styles which remain appealing to the modern eye. They are far removed from the rigidity of Mediterranean civilisations.

This was not art for art's sake. Celtic art was intended to decorate and embellish a range of items, generally for the richest members of society. In general the objects chosen celebrated the heroic virtues of the age – fighting, feasting and drinking. Swords, shields, helmets and other items of weaponry were especially favoured for the display of decorative prowess.

The display of status and prestige was all important. Many of the most finely decorated shields, for example,

could never have withstood a sword blow. Their value was in the prestige they gave to their owners.

However, the majority of people would have been farmers. The remains of their roundhouses are found all over Scotland. In the east Iron Age farmers built large semi underground grain stores (known as souterrains) to store their produce. Many hundreds have been identified from the air, as marks in the crops of modern arable fields.

The most prominent monuments from this period, however, are hillforts. One of the most important is on Traprain Law in East Lothian, a capital of the Votadini, who inhabited the Lothians during Roman times. Hundreds of years earlier, however, it had already been the site of a large and bustling defended settlement. Excavations from 1914-23 found the remains of many Late Bronze Age houses. Traprain was therefore a major centre of population at the time when Celtic languages were beginning to evolve across Europe.

Similarities also seem to have existed between certain Celtic areas in matters of religion. Greek and Roman writers describe a powerful priesthood, known as druids. Their religion operated without written documents, however, and is now lost. Classical authors write of barbaric practices, including human sacrifice. But these were the writings of enemies. The Romans suppressed the druids, regarding them as a threat.

Celtic languages were to more or less disappear across mainland Europe in the early centuries AD as the Roman Empire fell apart, though they continued to dominate in the far north and west. For example, the languages of the Picts and the Gaels were distinct, but related, forms of Celtic. By that time, however, the appearance of Anglo Saxon languages in England was already signalling the beginning of the long, slow decline of British Celtic languages. ●

■ Sculpture of Brigantia, from Birrens in Dumfriesshire. Created in the 3rd century AD, this Roman carving portrays a Celtic goddess in Roman style.



■ A sound similar to that from a didgeridoo is made by this reconstruction of a Celtic war trumpet. Below: The original, found in Banffshire in 1916.



The art of noising up your enemy

One of the finest pieces of Celtic artwork from Scotland is the war-trumpet called the Deskford carnyx. This extraordinary object was found during peat-cutting in Banffshire in 1916.

It was probably placed in a bog or pool as part of a religious ceremony – quite a common practice in Iron Age times. The carnyx consists of a long tubular bronze neck, with an elaborate boar's head forming its mouth. Similar objects are known from both Celtic and classical art.

The Romans seem to have regarded these war trumpets as a typically Celtic piece of paraphernalia. They seem to have been played as a prelude to battle, to unsettle the enemy by creating a great noise, not unlike the use of bagpipes in more recent times.

Recently the National Museums of Scotland commissioned a functioning replica of this extraordinary object, which visitors can now see, and hear, along with the original.

A collaboration of archaeological and musicological experts concluded that the carnyx was played much like a didgeridoo, giving a rather rasping, rattling sound. It was even equipped with a wooden tongue to add to the general clatter.



TIMELINE

1,000 BC

The Celtic languages begin to spread across Europe.

390 BC

Celtic tribes sack Rome

325 BC

Greek sources mention Orkney, the first Scottish place recorded in history.

150 AD

The Greek writer Ptolemy records the names of 16 Celtic tribes in Scotland.

Next TIMELINE
in Part Three

Roaring game delights in a frosty reception

When winter's frosts are hard and the temperature stays below freezing for a fortnight or more, the temperature of certain Scots rises steadily in excitement and anticipation. These are the curling enthusiasts. They could be heading for one of those rare occasions when the ice on the lochs is thick enough to take the weight of several thousand people. Then the call goes out. Let the Bongspiel commence!

For the Grand Match (as it is also known) to take place, the ice has to be at least eight inches thick (203mm). In 1979, about 10,000 people crowded on to the ice at Lake of Menteith, near Aberfoyle, and were in serious danger of a cold bath. They had been advised to bring inflatable lifejackets and a diver was on standby just in case. But this colourful event is not to be missed, as the 2,400 curlers and numerous spectators head for the ice from all over Scotland to play the traditional North versus South match. Apart from Menteith, four other lochs are possible venues: Loch Leven (Kinross), Stormont Loch (Perthshire), Loch Morlich (Aviemore) and Lindores Loch (Fife). Yet the ice has obliged only 33 times in the space of 150 years and there were fears that because of global warming, the 1979 Bongspiel was the last.

Yet every winter, the North and South both select their 300 teams of four. Local committees monitor the development of the ice at all five lochs and if any ice sheet reaches six inches in thickness with a forecast of more frost, the Royal Caledonian Curling Club in Edinburgh is alerted. This has to be "black ice", not the less safe "white ice" which includes melted snow. If eight inches is achieved the game is on. Curlers and spectators are given 48 hours' notice, and they converge from all over the country. An ancient canon is fired to start the Bongspiel, and the 300 matches begin. Theoretically, each match comprises 12 ends, making 3,600 separate contests. But because of essential pauses "for refreshment", the full programme may not be completed in the three hours before the canon is fired again to halt proceedings. The first of these remarkable events, in 1847, was much smaller in scale with 48 curlers and a handful of spectators. It was called by Sir John Clerk of Penicuik, the great arts patron, at his estate near Edinburgh.

Curling is sometimes called the roaring game because of the sound the heavy stones make as they slide across the ice. In the open, frost-laden air, the rumble is more dramatic than in a modern ice



■ A canon is fired to commemorate the opening of the 1963 Bongspiel at Lake of Menteith.

rink. But this is yet another sport which both the Scots and the Dutch claim to have originated. Holland's claim is partly based on 16th century paintings by Pieter Breughel the Elder, which show what look like curling scenes but the players were not using stones. They probably used frozen clods of earth or wooden blocks. Stones are essential for proper curling, and so many old examples of these have been found in Scotland that the country is recognised as the sport's home.

Historians have found ancient Scottish curling stones in an array of shapes and sizes, some so large and heavy that they could only be deployed by men of exceptional strength. The earliest ones, known as loofies, were small enough to fit into the hand and were lobbed across the ice. Eventually, larger stones were fitted with handles and then the size, shape and weight of stones were standardised. The hard, close-grained granite from Ailsa Craig, an island off the Ayrshire coast, has long been the most popular material. The rules of the game were first set down in Scotland and the Royal Caledonian Curling Club was the first governing body. Now, about 30 nations are affiliated to the World Curling Federation and compete in

international championships. Television coverage helped to popularise the game, attracting a larger number of younger players. In Scotland, more than 20,000 curlers belong to local clubs.

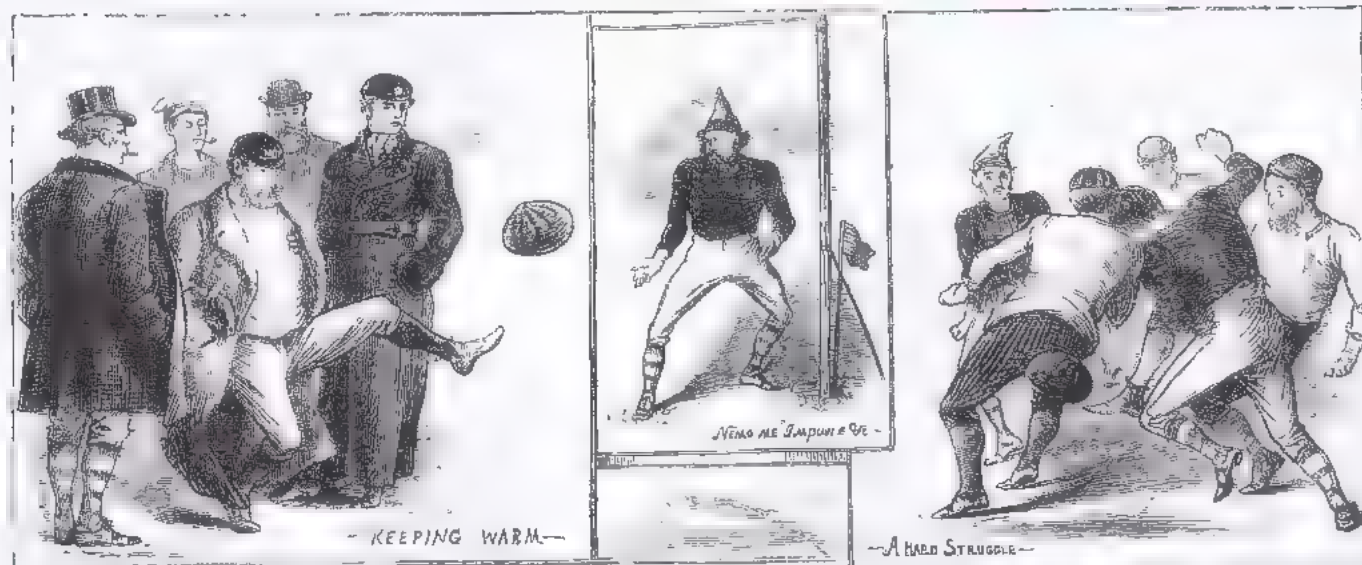
But the modern indoor game still owes much to its rustic beginnings. When the player sends a stone across the ice towards the target, or "house", the skip may call on the two other players to sweep with their brooms. Originally, this was done to clear the ice of any twigs or fallen leaves in the stone's path. But brisk sweeping slightly melts the surface and speeds the stone on its way. One great skill is the technique which gave the name curling. When the stone is sent it can be "birked", or made to spin, in either a clockwise or anti-clockwise direction, causing it to curl to the right or left.

Yet despite the benefits of the modern game the unproved equipment, the designer gear, the bar upstairs overlooking the rink something happens to the Scots curler in the winter frost. There's a longing for the freeze to last, for the ice to thicken on the lochs. Only then will the roaring game truly take on its original flavour of a social pastime, a chance to meet and crash stones with old friends.

That figures...

7500 the number of Scots citizens of Berwick slaughtered by Edward I in 1296.

47 The number of Spanish infantry who landed in Stornoway in the 1719 Jacobite Rising.



■ Drawings from the time show the big match action from Scotland's first clash with England which took place at Partick, in Glasgow's West End.

Auld Enemy open hostilities at Partick

4,000 witness world's first international football match

SCOTLAND 0, ENGLAND 0: November, 30 1872

Match report and run of play as reported in
The Scotsman

The match came off on the West of Scotland Cricket ground, Glasgow, on Saturday, in presence of the largest assemblage seen at any football match in Scotland, there being 4,000 spectators, including a good number of ladies.

The day was dull though dry, but the rain of the previous night had made the ground somewhat soft. The English team was very strong, comprising representatives from nine of the crack clubs of England.

During the first half of the game the English team did not work so well together, but in the second half they left nothing to be desired in this respect. The Scotch team, on the other hand, though not comprising so many brilliant players, worked from first to last well together, through knowing each other's play. The match ended in a draw.

The English uniform consisted of white jerseys, dark blue caps, and white trousers and knickerbockers. Dark blue jerseys, white knickerbockers, blue and white striped stockings, and red cowls completed the Scottish uniform.

The teams were SCOTLAND - R Gardner, J Taylor, J Weir, J T Thomson, W Mackinnon, Alex Rhind, D Wotherspoon, R Leckie, W Kerr Granville, R Smith, J Smith (all Queen's Park).

ENGLAND - C. J. Ottaway (Oxford University, captain), C J Chenery, (Crystal Palace), J G Clegg, (Sheffield), R H Greenhalgh (Nottingham), P M Chappel (Oxford University), R Barker (Hert. Rangers), C J Morice (Barnes), W. J. Maynard (1st Surrey Rifles), A Kirke-Smith (Oxford University), R C Welch (Harrow Chequers), J Brockbank (Cambridge University).

Run of play from Glasgow

Shortly after two o'clock play began. The Scottish captain, having won the toss, chose the upper goal, England having the disadvantage of fighting up the brae during the first half of the game.

The English captain led off with a good kick, but it was quickly sent back by one of the Scottish half backs, and after some skir-mishing, the English captain distinguished himself by a beautiful piece of dribbling till he had got within 15 yards of Scotland's goal line, finishing up with a good kick which sent the ball over.

The Scotch now came away with a great rush, Leckie dribbling the ball so smartly that the English lines were closely besieged, and the ball was soon behind

Scotland's Rhind and Weir put the pressure on with a piece of excellent play, until Welch stopped them. England made another gallant attempt on the Scottish line, and were twice splendidly repulsed.

In turn, Scotland twice made splendid rushes, Weir and Rhind showing up front. English territory was again cleared, until Weir and Leckie once more put their goal in danger, passing all the English forwards. Greenhalgh, however, came to the rescue and after charging first one and then the other of his opponents, piloted the ball

splendidly out of danger. Scotland immediately bore down again on their opponents' goal, and through a misunderstanding at the back, Weir got free, but the great speed of the English captain enabled him to retrieve the threatened disaster, and put the ball out of danger.

The Scottish team continued to impress, and so certain did success appear that the greatest excitement prevailed, a good kick from Leckie causing tremendous cheering from all parts of the ground, so satisfied were the majority that a goal had been won for Scotland. To the great chagrin of the Scotch it was, however, given no goal, the ball passing hardly an inch above the tape.

Both sides redoubled their energy for the second half. The English came away in fine style, Ottaway, Clegg, Kirke-Smith, and Morice making vigorous onslaughts which were as brilliantly repulsed.

The Southrons made another splendid effort to get through, but it was as well beaten off. Brockbank on one occasion, when dribbling the ball well into Scottish ground, was splendidly charged by McKinnon and Wotherspoon - the whole three falling heavily. Nothing else of note occurred, time being called and the match thus ending in a draw.

Geologist rocks the country

Hugh Miller traded in life as a quarry worker to become a revered author and geology lecturer

It might seem a short step from stonemason to geologist. The obvious link is a concern with rocks. But it's a mighty step from being a 19th century mason from a poor family in the Highlands to a self-taught geologist, palaeontologist, folklorist, writer and campaigning journalist who became the darling of the Edinburgh drawing rooms after the time known as the Scottish Enlightenment. This is why it has always been difficult to classify Hugh Miller, although the word genius comes to mind.

Born in 1802 in Cromarty, the grandson of a small-time pirate and son of a sea-captain, he was driven more by his own curiosity than the quality of his schooling. In fact, the parish school he attended was next door to the local slaughterhouse which was a great diversion for most pupils.

Also, the school had its own annual cockfighting festival, and the pupils had to pay the master two pence for every bird he dropped into the cock-pit. The young Hugh preferred to wander the nearby beaches with a hammer, discovering the geological riches which lay there in the boulders and pebbles.

Hugh's father had gone down with his ship when the boy was only five. So despite Hugh's emerging talents, he had to go straight from school to work in the quarries and on building sites around the Black Isle.

Miller worked in this tough way for 15 years, often returning at night to his books. Before he was 30 he began to write articles for a local newspaper and pamphlets on a wide range of subjects. Marrying in 1831, he moved to Edinburgh to work in a bank, becoming instead the editor of the twice-weekly Free Church magazine, *The Witness*. He frequently used its pages to expound his original theories on rocks and fossils, showing that the Free Church did not shut its mind to the emerging sciences, while the Church of England, for example, was deeply hostile. His writing encouraged lively debate on the lessons of geology and the biblical theory of creation. Eventually Miller published his theories in an influential book called *The Old Red Sandstone*.

His fame as a writer, thinker and social campaigner grew as Edinburgh swarmed with academic and artistic giants. Despite being a shy man, Miller enjoyed giving lectures on geology or delivering spooky tales from Highland mythology to the ladies of polite society. He was even sought out by the Duke of Argyll, who wanted to develop an interest in science by having Miller as a guest at Inverary Castle. Apparently, he declined the offer.

Among the friends he made were photographers



■ Hugh Miller and (inset) his home in the village of Cromarty.

pioneers Robert Adamson and David Octavius Hill, and Hugh would pose for them in stonemason's garb. He also liked challenging his friends to physical contests such as throwing heavy boulders, knowing that with his hard, earlier life he was bound to win.

But a dark side also lurked in Miller's character, a morbid sort of melancholy which is often supposed to be part of the Highland personality. He believed he occasionally saw the spirits of dead people.

In 1856, as he completed another book called *The Testimony of the Rocks*, he became prone to dizzy spells and strange anxieties. On Christmas Eve, tormented by a recurring dream, he rose from his bed at his house in Portobello and shot himself through the heart with a revolver. A huge crowd turned out for his funeral, including many scientific luminaries and theologians. Ironically, his pink granite headstone at the Grange Cemetery has been described as "faintly vulgar." But his final book was a critical triumph.

Deadly side to pirate's home-coming party

John Paul Jones

When John Paul Jones sailed his American warship into the River Dee in Kirkcudbrightshire, he was entering familiar territory. For this was the corner of Scotland where he'd been born about 30 years earlier, in 1747. But Jones wasn't there to visit old friends and relatives. On the contrary, his plan was to take a party inland and kidnap the Earl of Selkirk, who had threatened to bring him to justice for treason.

Alas for Jones, the earl wasn't at home. So the disappointed sailors robbed the nobleman of his silverware, and departed.

Was Jones a hero or a villain? That obviously depends on where you're sitting. But to the Americans fighting for independence from Britain, the Scots-born mariner who had settled in Virginia and laid the foundations of America's navy was a champion of the first order. Born John Paul, the son of a gardener on the estate of Arbigland near Kirkbean, Jones had a chequered seagoing career even before joining the American cause. At sea from the age of 12, he had served on slave runners and had the reputation of a short-fused disciplinarian. In fact, his sailors had mutinied and he was facing two charges of manslaughter when he fled to America.

But his exploits against Britain gave a massive morale boost to the American Revolution. At first he was involved in successful minor actions off the American coast. Then basing himself in the French port of Brest, he took the sea war to British waters, carrying out a succession of raids which included one on Leith. The British regarded him as little more than a pirate. But although his career went wrong after their independence was won, the Americans heaped him with honours. He died in Paris in 1792. His only memorial in Scotland, in the church at Kirkbean, is a font subscribed in 1945 by the US Navy.



■ John Paul Jones made his name by invading his home country.

Mill girl to African pioneer

Mary Slessor

She was a mill girl in Dundee from her childhood. Her mother was sick and her father a drunkard. Her two brothers died, followed by her father. Thus, at 14, she was left to care for her mother and two sisters. That was in 1862.

Yet in 1875, Mary Slessor nursed what seemed like an impossible dream: to follow in the footsteps of her great hero David Livingstone and become a missionary in Africa.

The fact that Aberdeen-born Mary achieved this at all was a testament to courage and sheer determination. Waiting until her sisters were old enough to work, she managed to overcome the severe prejudice against unmarried women in pioneering roles. She was accepted by the Foreign Mission Board of the United Presbyterian Church and was posted to West Africa, arriving in Calabar at the age of 28.

Slessor was unhappy about what she found in the missions of what would become Nigeria - an



unsympathetic attitude towards 'heathens and savages'. Requesting a move up country to areas never before penetrated by whites, she began instead to develop an understanding of the tribespeople and their customs, learning their dialects, studying their superstitions, eating their food, going barefoot and cropping her hair short.

Instead of Victorian petticoats, she wore a loose frock called a Mother Hubbard. She needed all of her courage to oppose the local

tradition of polygamy, and she took practical steps to fight the local practice of killing twins or infants whose mothers died in childbirth. Instead of facing death these children were adopted and brought into her own household.

The tribesfolk came to love her and called her 'Ma', and cared for her through frequent bouts of malaria.

Although she was eventually given official status as a magistrate, it was mutual love and respect that sustained her until malaria and dysentery finally claimed her, the one-time mill lass, aged 67.

Nothing was a bridge too far for Arrol

World-renowned bridge builder William Arrol combined engineering genius with a shrewd business brain to leave an indelible mark on the scenery of Scotland

No one in Scotland will ever forget Sir William Arrol – the legacy of his genius is there for all to see in the country's most impressive and magnificent man-made structure.

Arrol was the brilliant and inspirational Victorian engineer who built the Forth Bridge. He undertook one of the most difficult construction projects ever known to man and created a masterpiece.

This humble-born son of a cotton spinner was also the brains behind other huge building projects, including the Tay Bridge and Tower Bridge over the Thames in London. He was the forerunner of today's civil engineers, interested as much in the beauty and ingenuity of his creations as in their function.

Arrol was born in Houston, Renfrewshire, in 1839. Like many of his contemporaries, he had hardly any formal schooling, and was sent out to work at an early age.

His father had been badly hurt in an accident at work and, with nine children to look after, the family were desperate for money. As a result, young William was told to apply for a job at a Johnstone spinning mill and claim he was 13 years old. In truth, he was only 11.

His working life began as a cotton boy, picking up pieces of spare cotton on the floor of the mill. He later moved on to become a bobbin maker in Paisley but, not surprisingly, the job bored him so he moved on to take up a job as a blacksmith in the town, his first experience of shaping metal. Soon Arrol realised his ambitions went far beyond crafting small pieces of iron in a back shop.

In order to improve himself Arrol needed an education, so he took up hydraulics and mechanics at night school. The money for the courses couldn't come out of his ordinary wages – his mother needed those to pay for the family essentials – so he earned extra cash by mending porridge pots and burning hair off sheep heads so they could be eaten.

His dream of becoming an engineer took a giant step forward when he was in his early twenties.

After a spell out of work, he found employment at Laidlaw's Engineering Works in Glasgow.

By the age of 26, Arrol had graduated to building his first bridge, which was a railway viaduct in Greenock. He also gained experience in other types of construction, including a new pier at Brighton.

By now, however, the ambitious young engineer



■ William Arrol

yearned to work for himself. When he was 29, his chance came. He and a partner established a company and went into business at premises in Glasgow's London Road. Two years later, he raised the £84 necessary to buy his partner out. Suddenly he was on his own. Almost immediately, he won a lucrative contract to build a railway bridge over the Water of Leith in Edinburgh – the first of his major projects in the East of Scotland, where he would make his name.

In the same year, he built the Dalmarnock works

in the East End of Glasgow, which eventually ended up spreading over 20 acres and employing 4000 men.

However, it was in bridge building that Arrol's real genius lay. Even today, spanning rivers, valleys and gorges is one of the most difficult of engineering disciplines, with innovation and precision needed and danger at every turn.

Arrol regarded every commission as a challenge, and revelled in undertaking construction tasks others would regard as Herculean. When he bridged the Clyde at Bothwell, for example, he couldn't use the traditional support method of scaffolding, so he devised a special technique using prefabricated spans instead.

Sometimes the management of a particular project turned out to be more of a challenge than the work itself. When he was building the Caledonian Railway bridge in Glasgow, for example, his riveters attempted to capitalise on their position as skilled craftsmen by asking for an increase in pay.

Arrol, who was generally a reasonable man, calculated he could turn their request down and gain an increase in efficiency if he employed machines instead. He designed a special machine to put the rivets in, which turned out a much higher quality of work and was quicker than his obstinate labour force.

Arrol was lucky in one way: he was an inspired engineer at a time when the frontiers of technology were constantly being pushed back. Victorian Britain was expanding at a dramatic rate in every way. It was an age of enterprise and achievement, when no barrier to industry and to profit was regarded as insurmountable.

That included physical barriers – most particularly, the great river estuaries of the Forth and the Tay. Trains could whisk passengers from as far away as Dover to Edinburgh without any problems. After travelling over from the Continent, travellers could sit back and journey in luxury all



■ William Arrol's Tay and Forth bridges remain astonishing constructions and a lasting legacy to the man and his superb designs skills.

the way to Scotland's capital – but their journey by rail stopped there. The only way they could get across the Forth to Fife was to take the little ferry which had plied the river for nearly 1,000 years. To the entrepreneurial barons who ran the North British Railway, this wasn't good enough.

The East of Scotland had to be connected to the rest of the rail network – particularly as the company's great rival, the Caledonian Railway, was rapidly opening up the west.

Arrol was the obvious choice for the job. He was given the commission to build the mighty Forth Bridge from a design drawn up by the architect Sir Thomas Bouch, who had already constructed the Tay Bridge. Bouch's design envisaged a massive suspension bridge suspended by chains with a central tower 550ft high.

Before work could even start, however, disaster struck. In 1879 the Tay Bridge, which had opened only the previous year, collapsed in a December storm when the central high girders fell down. A train was on it at the time, and 75 passengers and crew were killed.

An inquiry blamed Bouch and the contractor for errors, and the Forth Bridge project was quickly abandoned. However, it did not stay dormant for long. The railway companies knew that the Forth still had to be bridged, and the scheme went ahead under two new architects, Sir John Fowler and Benjamin Baker.

They decided on abandoning the suspension bridge idea and instead using an ingenious design of three diamond shaped steel structures laid out in a cantilever design. The concept may have changed, but there was still no doubt about the best man to actually carry it to completion – William Arrol.

Arrol was also awarded the contract to rebuild the Tay Bridge, but it is his work on the Forth project which is best known. He signed both deals in 1882, and work started quickly afterwards.

Thousands of workers poured into South

Queensferry and North Queensferry to begin the massive Forth Bridge project. They toiled night and day for six years to create the largest and strongest steel superstructure in the world.

Arrol chose French and Italian workers where possible because he thought they wouldn't drink as much as the British. Under his constant direction, his labourers sunk huge metal cylinders right down to the bed of the river and then poured concrete into them.

Once the foundations were secure, the giant steel diamonds above them could be put into place. Gradually, the bridge took shape, with the narrow arms between the cylinders being built last.

For all the men involved, it was dangerous work. Arrol knew the risks they were taking, and did his best to ensure that the job was made as safe as possible. Rescue boats were kept on standby in case the workers fell in to the river, and safety netting was rigged up. He even kept hospitals and doctors onshore.

Despite all his precautions, there were dozens of fatalities. A total of 57 men had died and another 461 had been injured by the time the Prince of Wales ceremonially drove the last of the eight million rivets into place on March 4, 1890, awarding Arrol a knighthood at the same time.

The structure Arrol

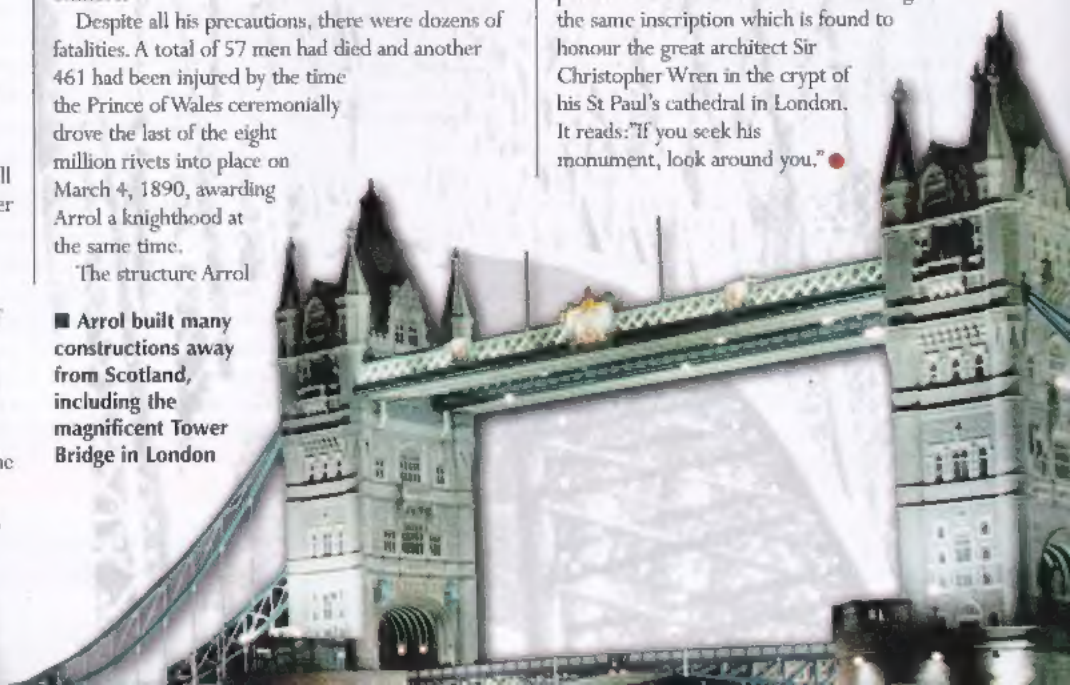
■ Arrol built many constructions away from Scotland, including the magnificent Tower Bridge in London

had created was awesome. A total of 55,000 tons of steel, 640,000 cubic feet of Aberdeen granite and 62,000 cubic feet of masonry had been used in its construction. It combined immeasurable beauty with function, and was immediately dubbed the eighth wonder of the world.

Arrol went on to build Tower Bridge in London between 1886 and 1894, and was also responsible for other structures across the world, including places as far away as Australia and Egypt. He amassed a fortune and went on to become the Liberal MP for South Ayrshire.

He died in 1913, but his reputation as one of the world's greatest civil engineers lives on. To this day, the Forth Bridge remains a vital link in Scotland's transport infrastructure. For all the brilliance of modern design and technology, the bridge remains a stunning example of human achievement.

Perhaps, in recognition of Sir William Arrol's great achievement, a plaque should be placed on the banks of the Forth bearing the same inscription which is found to honour the great architect Sir Christopher Wren in the crypt of his St Paul's cathedral in London. It reads: "If you seek his monument, look around you." ●





In the footsteps of the legions

Biker historian David R Ross investigates the legacy of Rome's North West Frontier



■ Many long stretches of Hadrian's Wall (above and top) are still complete.

When the Roman Emperor Hadrian visited Britain in AD 121 he ordered the building of the wall, from the Solway to the Tyne, that carries his name.

Although none of Hadrian's Wall is in modern Scotland, it is still seen as a psychological barrier between Scotland and England.

Many long stretches of it are complete, and the more interesting parts are well signposted, with information boards. The best-preserved stretch runs a little north of Brampton, eastwards to the area north of Hexham.

It is easy to stand atop this stonework and look north over the rolling moorland towards Scotland, as many a Roman legionary, used to much warmer climes, must have done, keeping an eye open for the warlike Caledonians.

Twenty years after the building of Hadrian's Wall, a push northwards was made to the narrow waist of land between the Forth and Clyde. Here the Antonine Wall, an earthen structure defended by a deep ditch, looking north to the Campsie and Ochils, was built.

Several stretches of the Antonine Wall exist in a reasonable condition, and are well worth visiting to marvel at the tenacity of the Roman builders.

The later Forth and Clyde canal follows the same basic route as the Antonine Wall, and near it, on the stretch between Castlecary and Falkirk, via Bonnybridge, are sites such as Rough Castle and Seabegs Wood.

Rough Castle has an interesting surviving defensive feature, known as lillia, or pits to break up a charge, probably originally containing sharpened stakes. A remnant of the stone base of the wall is visible in New Kilpatrick cemetery in the Bearsden and Milngavie area.

The Romans also built a supply port for shipping at Cramond, where in recent years a carved stone lioness was found in the River Almond.

Two main routes ran north to the Antonine Wall. One followed the line of the A68 through Lauderdale, and north over the Lammermuirs at Soutra, a line later used by many English armies of invasion. The other followed a route similar to the modern M74/A74, threading up Annandale, and over into Clydesdale.

But all the back-breaking work of the Romans was to no avail. Around AD160, the Romans abandoned the Antonine Wall, moving back to Hadrian's Wall, holding it for another 100 years until the Roman Empire began to

decline. There had been forays north of the Antonine, of course – there is that abiding legend that Pontius Pilate was born at Fortingall in Perthshire, where stands an ancient yew, said to pre-date these times.

Many forts and sites scattered over southern Scotland can be found on Ordnance Survey maps. Strathclyde Park has an excavated bath-house that stands on the bank of the South Calder, where it enters the man-made loch. A well-defined rampart and ditch can be seen above the A72 west of Peebles, some 500 metres west of Lyne Church.

■ Throughout history no-one has managed to gain rule of Scotland by armed invasion

It was the base of a cohort of cavalry and the sheer size of scale leaves one in no doubt as to the power wielded during the days of the Roman occupation of Scotland.

Throughout history, despite numerous attempts, no-one has ever managed to subjugate Scotland by armed invasion.

Politics may be another force to be reckoned with, but when all of Europe had finally bowed to Roman conquest, Scotland alone was able to hold off what must have seemed to be relentless and overwhelming odds.

That figures...

27 The number of canon on James IV's flagship the Great Michael.

67 Islands make up Orkney. Roughly two-thirds are uninhabited.

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Cover: The Trilimontium Trust, Still Moving Pictures. p4/5 Crannog photographs Nick Dixon. p6/7 broch photograph, Historic Scotland; illustration, Harry Bland. p8/9 all National Museums of Scotland. p10/11 model, Samantha Ramsay; Torc, NMS; fishermen, Leila Angus, Eolas. p12 Shants from Eolas. p13 wooden figurine, NMS. p14/15 shield and spearhead, spears and vessel, NMS. p15 Duddingston Loch,

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**FIRST PRESS
PUBLISHING**

DAILY RECORD AND SUNDAY MAIL MAGAZINE DIVISION

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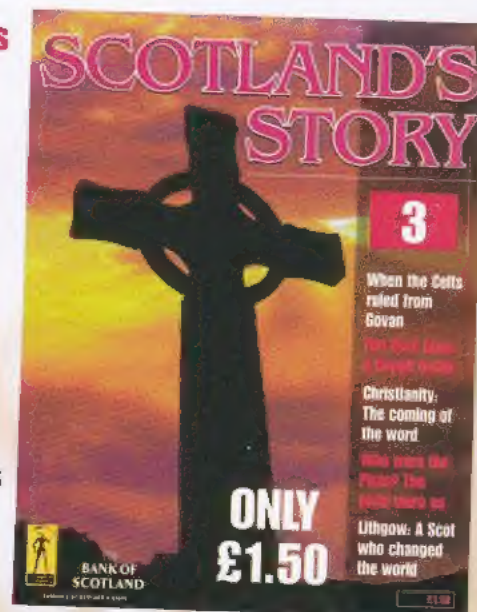
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